WORLD'S LEADING PHOTOGRAPHIC MAGAZINE

POPULAR PHOTOGRAPHY

AUGUST, 1955
35 CENTS

A ZIFF-DAVIS PUBLICATION

Bert Six

35-mm ISSUE

Packed with facts about

- cameras
- lenses
- films
- filters
- color
- processing
- available light
- picture ideas

Here's where you'll get better color pictures

NEW HIGH-SPEED

ANSCOCHROME COLOR

1 *In dim light* like this you can get fully exposed Anscochrome transparencies—often without a super-speed lens. Thanks to its high-speed (Exposure Index, 32), Anscochrome lets you get pictures with an f3.5 lens under conditions where old-style color films would call for an f2.0 opening. (Illustration made at 1/50-second f4. with natural light filtering into railway station.)

2 *With blue flashbulbs* you'll find the extra speed and wide latitude of new Anscochrome films carry the color right into the shadows, and greatly increase the covering power of your flashbulbs. (Illustration made with 5B blue bulb, using a guide number of 95.)

Remember:

Anscochrome gives you positive film transparencies that let you see the color clearly, brilliantly—just as your camera caught it. You can process Anscochrome and make natural color Printon prints in your own darkroom. Or your dealer can give you prompt and inexpensive service through the Ansco color finisher near you.

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ANSCO, Binghamton, New York.

with

FILM

3 *With fast-moving action* Anscochrome lets you use action-stopping speeds with smaller lens opening for sharper, crisper pictures. (Illustration made at 1/500-second f5.6 on sunlit beach).

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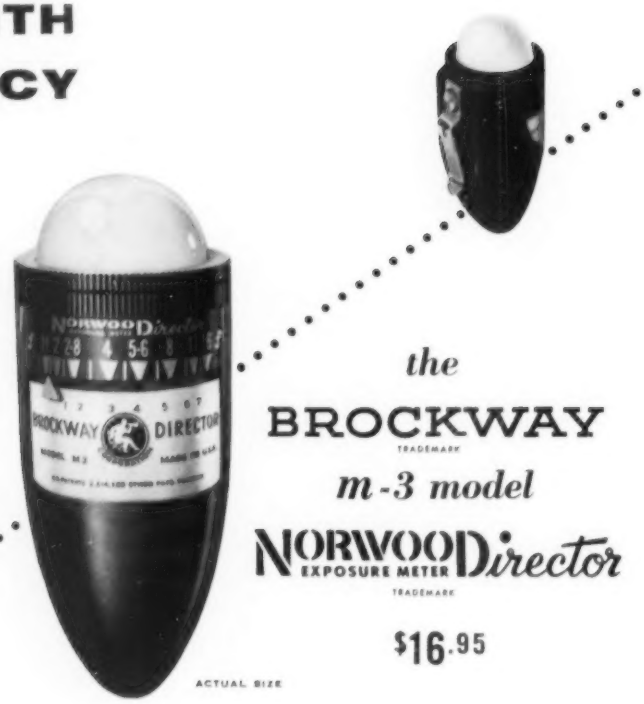

ACTUAL SIZE

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m-3 model
NORWOOD Director
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TRADEMARK

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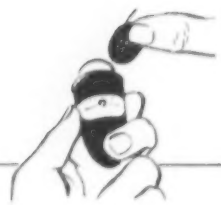
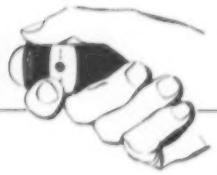


1

INSERT SLIDE
—set shutter speed marked on slide



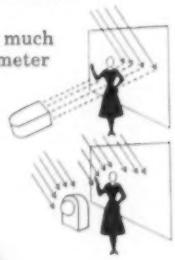
2

POINT METER
toward camera

3

READ DIRECTLY
—either regular f/stop or Polaroid setting

. . . AND THE M-3 MEASURES
INCIDENT LIGHT—THE *RIGHT* LIGHT



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VOLUME 37 NUMBER 2

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WORLD'S LEADING PHOTOGRAPHIC MAGAZINE

Bert Six has the enviable job of making stills of Hollywood's bright lights. For us he supplied a shot of starlet Joan Collins, soon to appear in a Warner Brothers film, *Land of the Pharaohs*. Mr. Six used an Ansco View camera and a 14-in. Kodak Ektar f/6.3 lens. Exposure on Daylight Ektachrome was at f/12.5, with five-lamp Kodatron electronic flash unit and CC05y filter. See page 50 for another look at Miss Collins.

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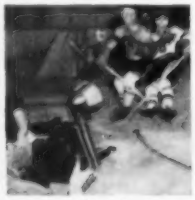

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letters to the editor

The Pulitzer Prize: Pro . . . and Con

We disagree 100 percent with the conclusions reached by Bruce Downes in his article on the Pulitzer Prize.

We will take the Pulitzer style of photographic journalism every day in the week as compared with the "nothing" pictures in your mag.

R. O. Hulbert
Ashtabula, O.

Thank you for sending me the May issue of Popular Photography with its excellent reproduction of the Pulitzer Prize Pictures. I think these pictures are the best answer to the question you raise about the usefulness of the Pulitzer Prize in Photography.

John Hohenberg
Secretary, Pulitzer Advisory Board,
New York, N. Y.

I agree with your position wholeheartedly, and the photographs you published bore it up very effectively.

J. Murray Mitchell, Jr.
Seattle, Wash.

Your criticism of the Pulitzer is well justified. These awards do not meet with the approval of serious photojournalists and are becoming more ridiculous every year.

The Pulitzer Prizes in photography do not have the same stature as awards in other types of news coverage because the judges are not recognized as authorities in photojournalism, and the basis for selection is the accidental presence of the photographer at a news event.

The awards should recognize and encourage the perception, imagination, and creative ability of the photographer as applied to the visual perception of the news.

Arthur Rothstein
New York, N. Y.

You were so right . . . This year's award was no exception. That shot doesn't even tell the story one would expect from a Pulitzer Prize picture. Those two people could be doing anything other than grieving over the loss of their child. The jury of selection should be people interested in seeing photography improve. Someone who has seen pictures made by other than run-of-the-mill newsmen.

I was very happy to see someone "dare" to come out in print with such an article as this, and I hope it makes the donors think a little more next year.

Jack McKeown
Los Angeles, Calif.

Although the prize, as stated in the will of the late Joseph Pulitzer, is awarded to newspapermen I can see no reason why your editorial should not reflect a positive point of view to the School of Journalism.

For the last decade or so our magazines

have been practicing the photojournalistic style which represents a muted testimony of visual truth viewing the tempo of events in our civilization. I have confidence that the Committee will see the light and in time include picture stories for Pulitzer awards. And you might hope to bring the best of photo-journalism to the attention of the Pulitzer Prize Committee.

T. ANTHONY CARUSO
Brooklyn, N. Y.

The Stereo Picture: Why Vertical?

Looking at a stereo picture that is higher than it is wide is ridiculous; and the manufacturers who let stereo get stuck in the vertical-format rut are responsible for the entire situation. People just don't see things vertically.

Our horizontal vision is about 180°, and our vertical vision about 120°. This gives an aspect ratio of about 3 to 4½—which is the most pleasantly shaped window to look through.

The next time you look into a stereo viewer, notice the large black areas on each side. Too much of your vision is blocked off. I have tried experimenting with full 35-mm horizontal stereo slides, and the results are even more effective because the pictures covered the entire field of view.

I believe the only reason the present system is so widely accepted is because color stereo is so fantastically beautiful that the public grabbed it without realizing what they might have had. If they had demanded it, the manufacturers might have developed a horizontal format.

R. A. MARQUARDT
Garfield Hts., O.

Short Loads or Bulk Film?

What goes on here? Always looking for a camera I didn't have to reload every time I turned around, I finally got a complete 35-mm outfit. So what happens? After happily using 36-exposure rolls, I asked for the new Ektachrome at a photo store, and what do they hand me? Those sawed-off 20-exposure mistakes! Maybe the film will be available in bulk loads, I'm told—as if I got rid of my 4x5 outfit to go back to loading film in the dark! Now the same story with Anscochrome—20-exposure rolls only.

If there are people so lukewarm about photography that they can't finish a full roll before it expires, let them get Bantam cameras. Or let *them* load short strips of bulk film for their own use.

DONALD HAMILTON
Sandia Park, N. M.

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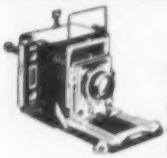

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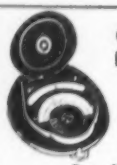

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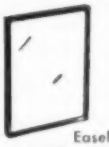

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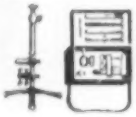

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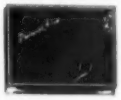

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A round-up of recent developments and significant trends

3-D Prices Down. Stereo equipment is becoming more and more reasonable as the camera industry strives to bring the present 3-D boom to the level of several years ago. Latest entrant in the field is the Edixa Stereo Camera with Coupled Rangefinder (Model IIa) priced at only $79.50—distributed by Camera Specialty Co., Bronxville, N. Y. This is a product of Wirgin Brothers Camera Works, Wiesbaden, German Federal Republic (West). Features: 35-mm Steinheil Cassar *f*/3.5 lenses; rapid-wind lever that transports film simultaneously with shutter cocking; double-exposure prevention lock; X- and M-synchronized Pronto shutters with B, 1/25, 1/50, 1/100, and 1/200 second with a self-timer . . . Sawyer's, Inc., has made significant price reductions in its basic 3-D equipment: List price of the View-Master Personal (stereo) Camera has been dropped from $139.50 to $89.50, and the View-Master Stereomatic "500" Projector which handles 7-pair stereo reels has gone down from $169.50 to $119.50. Proportional price reductions have also been announced for their Camera Flash Attachment, Camera Carrying Case, Projector Case, and Film Cutter.

RCA "Electrofax." The latest development in electrophotography, which until now has been entirely concerned with Haloid's xerographic process, is a low-cost photosensitive printing paper announced by RCA last December. A detailed description appeared in the December 1954 issue of the *RCA Review* in a paper entitled *"Electrofax" Direct Electrophotographic Printing on Paper* by C. J. Young and H. C. Greig of the David Sarnoff Research Center, Princeton, N.J.

The new printing paper is as sensitive as standard photographic papers and can be used for reproducing line-copy as well as continuous-tone negatives. It has also been exposed experimentally in a camera with success. In all cases, image formation and development is achieved by electrostatic means, as in Xerography. Essentially, Electrofax print material consists of an ordinary paper stock coated with a thin layer of a special zinc oxide in a resin binder—both inexpensive and readily available materials. The coated paper is sensitized to light prior to use by subjecting it to a negative electrostatic charge in a corona discharge unit—in the dark. After the sensitized paper has been exposed by contact or projection, the electrostatic charge in the areas exposed to light is reduced in proportion to the intensity of the printing light, leaving a latent electrostatic image on the coated paper surface. The image is developed by sweeping a mixture of iron filings and pigmented resin powder across the entire paper surface with a magnetic "brush" which instantly reveals the image as the powder clings to the darker areas of the scene. The image is permanently fixed by baking the sheet for a few seconds at a relatively low temperature, which causes the resin powder to melt and fuse to the coated surface. An unsatisfactory image can be brushed off before the baking takes place so that the paper can be recharged and exposed again.

The normal spectral response of the print material, in the near ultra-violet, can be extended into the visible range by sensitization with organic dyes specified in the published paper. With the normal non-dye sensitized material, contact exposures of 1 to 2 seconds can be made with a pair of 4-watt white fluorescent lamps at a distance of 20 inches . . . The resolution of Electrofax paper when processed by the magnetic-brush method has proven sufficient to produce legible 35-mm microfilm contact prints. As far as exposure and processing time is concerned, the RCA scientists aver that even when all the steps are carried out by hand, a finished print can be produced in less than a minute . . . By way of application, RCA has developed a rudimentary portable unit for hand processing as well as a large continuous-strip device for mechanized operation; also a smaller intermediate unit for making single prints from projected images.

Criminal Detection. One of the early references in the photographic consumer literature to the Kodak Ektron Detector (essentially a tiny bar of light and heat-sensitive lead sulfide connected to electrical sensing apparatus) was included in our feature article on Kodak High Speed Infrared Film (August 1954 PHOTOGRAPHY, page 66 *et seq.*). We speculated at that time on the possibility that this tiny apparatus might eventually be incorporated in an exposure meter for infrared photography. So far, this application has not materialized. The Ektron detector has, however, found its way into burglar-detection camera setups as a replacement for photoelectric cells which can be desensitized by exposing them to intense doses of light. By contrast, the Ektron detector is "jimmy-proof." A section in the new Kodak Data Book, *Criminal Detection Devices Employing Photography*, describes a simple camera-tripping circuit utilizing the Kodak Ektron Detector. A beam of light, with its visible components completely absorbed by infrared-transmitting filters, is directed across the protected area to a flat red surface which reflects the radiations back to an Ektron cell through which a steady flow of electric current is passing. The instant the intensity of the radiations reflected to the Ektron cell is changed by any interruption of the beam path, the camera and exposure-light triggering apparatus coupled to the detection circuit is actuated, and the desired picture of the intruder is made (by visible or infrared light) and, if desired, an alarm set off. Relative-

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ly inexpensive, Ektron detectors are available in a range beginning at $14.50 through the Industrial Sales Division of the Eastman Kodak Co., Rochester 4, N. Y. And, apropos of the use of Ektron Detectors for low-level light-intensity calculations, a description of their structure and characteristics is included in the staff report, *Miniature Cadmium Sulfide and Lead Sulfide Photocells*, published in the April 1955 issue of *Electrical Manufacturing*, 1250 Sixth Avenue, New York City.

E-K Minicard System. We recently came upon still another interesting application of the Kodak Ektron Detector while browsing through Vol.VI, No.1 (Jan.1955) of *American Documentation*. A 12-page article in this publication entitled, *The Application of the Kodak Minicard System to Problems of Documentation*, by A. W. Tyler, W. L. Myers, and J. W. Kuipers of the Eastman Kodak Co., describes a new photographic method of recording, filing, sorting, duplicating, and reproducing visual as well as digital information which combines the best features of microfilm and punched cards. The Ektron lead-sulfide cells, which are particularly sensitive to infrared radiations and actuate electrical sensing circuits serve as the "eyes" and fingers of the Minicard sorting mechanism.

The content of the published article had originally been presented at the annual meeting of the American Documentation Institute of Cleveland, Ohio, on November 4 and 5, 1954. The items of equipment referred to in the article were, at the time of the presentation, in various stages of design and construction and were not expected to be generally available "for some time." However, the basic principles have all been completely worked out and the potentialities of the system for organizing complex information are so profound that further publicity through the medium of this department is entirely warranted.

The heart of the new information-handling system is the Minicard—a 16x32-mm (⅝x1¼-in.) piece of photographic film with a rectangular slot near one end into which a metal "stick" is inserted for handling the "card." The stick can hold 2,000 "cards." Each Minicard can contain up to 12 rectangular image areas reproduced at a reduction ration of 60 to 1 (unprecedented in microfilm practice). In other words, a full legal-size 8½x14-inch page can be reproduced in each of the 12 areas. In addition, there is extra space on the "card" for coded digital information in the form of clear or opaque dots. When there are no visual images on the Minicard, there is room for 70 columns of code containing 42 "bits" each, which remain clear or opaque depending upon the code employed and the sorting and/or indexing information conveyed. The first two columns represent a "sorting field," the next four columns a "fixed control field," and all remaining columns an "open code field." It is in locating and interpreting the relationship of the opaque and clear dots that the Ektron detector cells, with condensing lenses mounted over them to concentrate the signal-radiation source, perform their function.

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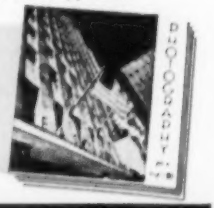

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Edixa Stereo Model IIIA shown with Steinheil Redufocus Wide-Angle Converter Set

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Steinheil's Scientists have just invented the New Redufocus which enables Stereo Photographers to instantly convert an Edixa Stereo to a Wide-Angle Stereo Camera! The Redufocus is attached, in a matter of seconds, to the Edixa Stereo Camera, and provides for outstanding interior shots, groups, sports, etc. The Redufocus wide-angle converter set is priced at **$89.50** with compensating viewfinder, and luxury leather case.

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The world's most magnificent Coupled Rangefinder Stereo Camera with Fully Automatic Features and f/3.5 Steinheil Cassar color-corrected lenses in two coupled Pronto shutters with speed settings of bulb, 1/25, 1/50, 1/100 and 1/200th of a second; also, self-timer, built-in flash, rapid-winding lever, double exposure prevention, self-cocking lever, cable and tripod sockets. Custom finished in black morocco leather and satin chrome. Priced at only.....$79.95.

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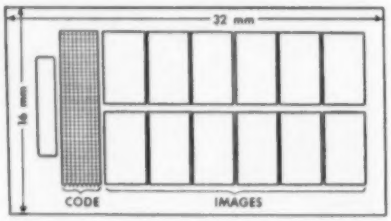
can be made with Minicards by contact printing, without causing the quality of the visual material or the coded information to deteriorate. Enlarged documents can be delivered from the system at any time. Exceptional resolution and visual sharpness have been achieved despite the fact that a much lower contrast is maintained than in usual photographic copying procedures. In fact, the authors claim that line and continuous-tone copy can be handled simultaneously with equal facili-



Twelve image areas (with a 60:1 reduction ratio) plus a flexible code field can be included on a single 16x32-mm Minicard film.

ty. It is estimated that as many as 1,800 Minicards can be handled in one minute with the sorting and manipulation equipment now being developed. They are so compact that as many as 10 million cards can be stored in a 10x10-foot floor area. As far as examining the visual information is concerned, both a portable, low-cost personal viewer and a desk-type viewer with internal projection system and semi-automatic feed mechanism are under development. Other necessary equipment includes: camera, duplicator, typewriter-tape punch, film processor, film chopper, fine and block sorters and selector; also a code printer, enlarger, and print processor.

The informational content of Minicards is far greater than that of punched cards, and they can be manipulated and utilized far more readily than microfilm in conventional rolls. Costwise they are superior to both. There appear to be an infinite number of business, technological, research, and educational functions in which the Minicard information-handling system can be used to great advantage. Photography is about to be applied to still another new universe of activity as the equipment materializes.

Color Processing Units. Anticipating a quick upsurge in color film and print processing activity by independent photofinishing laboratories, and large-scale users, the Pako Corporation of Minneapolis announced in the Feb.-Mar. 1955 issue of *The Pakodoper* that it is putting the finishing touches on a Pako Color Laboratory for manual processing operations. The components are intended to fulfill a wide variety of requirements from a basic color film or print processing unit to a complete laboratory with several processing lines. The basic unit consists of various types of separate stainless-steel tanks, gutter sinks, and color tanksets, while optional units provide equipment for wall pass-through, re-exposure, gaseous agitation, roll- and sheet-film suspension, drying, temperature control, and other refine-

ments. The equipment is intended to take into account the various processing techniques and changing procedures required by various types and brands of monopack color materials.

Electrolytic "Replenishment." One of the fascinating aspects of the vanadium salt development system worked out by Kodak-Pathé research workers (T&T, July 1953) and subjected to further intensive investigation by the Kodak Research Laboratory in Rochester, N.Y. (T&T, February 1954) was the manner in which the used developer was regenerated by the simple expedient of passing electric current through two electrodes contiguous to the solution. Electrolytic regeneration of processing solutions has apparently been engaging the attention of E-K scientists for some time past, for a recently issued British patent (No. 720,235—applic. 9/1/51, granted 12/15/54—*Development by Ferrous or Titanous Salts:* A. A. Rasch and H. D. Russell) specifies the suitability of electrolytic treatment as a means of reactivating the newly disclosed developer. The latter, which is intended for use with fine-grain emulsions consists essentially of an inorganic reducing agent (a 0.4 to 0.05 molar solution of either ferrous or titanous chloride—or sulfate) with an organic chelating agent. The developer is highly acidic with a pH between 2.5 and 4.5. Results similar to those produced by metol-hydroquinone developers are achieved, but with shorter immersion times.

Odds & Ends. What is claimed to be the first photographic book-lending library in camera retailing was inaugurated last February by Willoughbys Camera Store, New York City. Some 1,000-odd titles are available ranging from elementary photography to the most advanced subjects. A $5 membership fee entitles borrowers to withdraw as many titles as they wish throughout the year, one book at a time.

. . . A simplified method for amplifying picture-image brightness on a phosphor-cell viewing screen without the use of electronic tubes has been worked out experimentally at the G-E Research Laboratory, Schenectady, N.Y. Relative contrast remains essentially unchanged as electric current supplied by a miniature high-voltage dry battery is applied to the viewing screen on which the ultraviolet image is projected. Presently available screens, which come in diameters up to 4 inches only, can magnify the incident light as much as 10 times by this method.

. . . Still another clue to the recent dramatic improvement in the quality of Polaroid one-step (pictures-in-a-minute) prints is given in U.S. patent #2,702,244 (February 15, 1955, to E. H. Land, assigned to Polaroid Corp.). It describes the use of a volatile amine as the alkali in the developer component of the processing fluid—ammonia and diethylamine being specified in the examples given. The amine evaporates gradually from the print without lowering the keeping quality of the image.—

THE AUTOMATIC PENTACON

AUTOMATIC PENTACON WITH:

50-mm f/2 fully automatic preset diaphragm Westagon $259.50

50-mm f/1.5 preset diaphragm Angenieux $21 $299.50

Here is the aristocrat of the automatic single-lens reflexes—the luxurious and impressive 35-mm Pentacon, superb product of German engineering. The Pentacon shows you the actual picture you are getting in the enlarged, film-size, eye-level prism viewfinder up to the instant of exposure to assure complete control of composition, image sharpness and depth of field. The image is erect with sides unreversed—a distinct advantage in sports and other fast action photography.

Some of the other outstanding Pentacon features are: coupled film transport and shutter cocking; speeds from 1 second to 1/1000th with a focal plane shutter; built-in synchronization for regular and electronic flash; built-in delayed action self-timer; interchangeability of lenses ranging in focal length from 28 to 1,000-mm; no parallax; available with a complete line of fully automatic and preset diaphragm lenses.

THE AUTOMATIC PRAKTIFLEX FX

AUTOMATIC PRAKTIFLEX FX WITH:

50-mm., f/2.8 fully automatic Isco Westanar $139.50

50-mm., f/2 fully automatic Isco Westagon $179.50

The Automatic Praktiflex FX is the latest model of the camera that has made photographic history by bringing you the countless advantages of the 35-mm., single-lens, reflex system with the versatility, operating speed and ease of the fully automatic preset diaphragm lens at a very moderate price.

The Automatic Praktiflex FX gives you the exact picture you see on the viewfinder ground glass by means of through-the-lens focusing—no parallax, complete control of composition, sharpness and depth of field, an upright image on the ground glass. Other features include: interchangeability of lenses from 28 to 1,000 mm., including a complete line of fully automatic and preset diaphragm lenses; built-in synchronization for regular and electronic flash; speeds from 1/2 to 1/500th second with focal plane shutter; and coupled film transport and shutter cocking.

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AUTOMATIC PHOTOGRAPHY

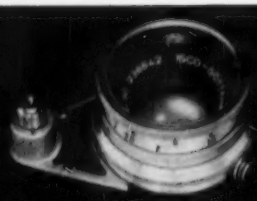
AMAZING AUTOMATIC PENTACON AND AUTOMATIC PRAKTIFLEX HAVE NEW AUTOMATIC LENSES!

AUTOMATIC WESTANAR

f/2.8, 50mm

Here is an excellent standard lens of high definition and quality. Renders gratifying results of professional caliber. Its 50mm focal length and f 2.8 speed make it suitable for general and specialized photography. The Westanar is a four-element lens with all qualities of a most modern objective.

Automatic Westanar f/2.8, 50mm lens is priced at . . . $69.50



AUTOMATIC WESTAGON

f/2.0, 50mm

The Westagon is a fast lens for general, action and dim-light photography; the product of the famous German factory, Isco-Gottingen. It has a focal length of 50mm with a maximum aperture of f/2.0. This added speed may make the difference between getting a picture and losing it. The Westagon is a six-element lens of advanced, postwar design.

Automatic Westagon f/2.0 lens is priced at . . . $110.00

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Omega D-2 with Omegalite	164.40 Cash or 16.44 Down
Omega D-2 with Condensers	173.50 Cash or 17.35 Down
Omega D-2 with Colorhead	183.50 Cash or 18.35 Down
Automega D-3 w. Omegalite	197.50 Cash or 19.75 Down
Automega D-3 w. Conden's.	207.50 Cash or 20.75 Down
Automega D-3 w. Colorhead	217.50 Cash or 21.75 Down

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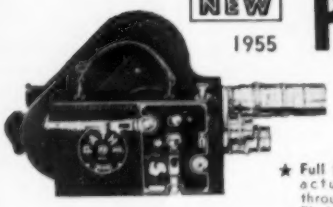
Extraordinary NEW Omega 120 Camera

• Supersensitive, pin-point accurate rangefinder • Retractable pressure plate for unvarying film flatness • New steady-grip design and oversized controls for touch-system operation • Automatic parallax compensating viewfinder • Automatic resetting action • 9 crisp 2¼" X 2¼" negatives on economical 120 roll film. With Omicron coated f/3.5 lens in Rapax X synch shutter **$239.50 Cash or $22.95 Down**; or with Omicron coated f/3.5 lens in Rapax full synch' shutter **$258.50 Cash or $25.85 Down.**

Selected Omega 120 Camera Accessories

6-shot Omegaflash	$49.50
Leather Compartment Case	32.50
Aluminium Carry-all Case	69.50

NEW 1955 PATHÉ "16"



★ **Full frame follow-focus.** You actually sight directly through the lens in use **while** filming. No parallax! No out-of-focus!

- ★ Built-in variable shutter
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- ★ 30 feet run on single wind
- ★ Optical viewfinder for various focal length lenses
- ★ Built-in hand crank
- ★ Tri-lens turret for standard "C" mount lenses
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- ★ Single frame device
- ★ All this—and only 5 lbs. in weight

$450. Cash or $45. DOWN

(lenses additional)

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YOU can produce 16mm talking pictures the Hollywood way! While "shooting" the Cine-Voice camera simultaneously photographs a sound track along one film edge. The film cost, black and white or Kodachrome, is identical to silent types. Magnetic striping is **not** required, saving you both time and expense. Best of all the processed film plays **perfectly lip-synchronized** on any 16mm sound projector! Compact and easy, to operate — either from house current or portable power pack — your Cine-Voice outfit is furnished **complete** as illustrated. Standard "C" mount lenses only are optional.

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Far-off vistas, fast sports action, candid close-ups are all captured clearly and brilliantly with hard-coated, color-corrected Elgeet telephoto lenses. And there is an Elgeet lens designed for **your** camera, priced for **your** movie budget.

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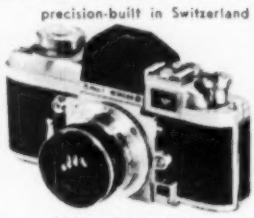

• **Optional Focusing:** Single-lens reflex groundglass or individual, single-window, coupled rangefinder AND multi-focal, "sportstype" viewfinder.
• **Unsurpassed Optics:** Everyone of the coated, high-resolving power ALPA lenses (wide angle through 3750mm!) is individually tested, carries an unconditional guarantee. Choice of click stops or FULLY automatic diaphragm with 50mm lenses.
• **Are you a perfectionist? Here's your answer:** The superlative Kern Switar 50mm coated f/1.8 APOCHROMAT, the **only** lens for 35mm cameras correcting all 3 primary colors, including red. Gives critical definition even at full aperture, f/1.8 (200 lines per mm.).

• **Unique Eveready Case:** Holds ALPA with wide angle, 50, 75 **or** 90mm lens; **plus** sunshade, filters and exposure meter.

• Your Choice of Lens Determines Price of Camera	ALPA 5 (Prism Reflex)	10% Down	ALPA 7 (Prism Reflex & Range-finder)	10% Down
Old Delft Alfinon 50mm coated f/2.8	$309.00	$30.90	$349.00	$34.90
Schneider Xenon 50mm coated f/1.9 with FULLY automatic diaphragm	389.00	38.90	429.00	42.90
Kern Switar 50mm coated f/1.8 APOCHROMAT	419.00	41.90	459.00	45.90

Selected ALPA Accessories

Macrostat Copy & Close-up Stand **complete**	$139.95
Old Delft Alfinar 38mm coated f/3.5 lens	94.00
Schneider Tele-Xenar 90mm coated f/3.5	124.00
Old Delft Algular 135mm coated f/3.2 lens	139.00
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Zoomar Reflektar 1000mm coated f/8.0 lens	1500.00
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Pan Cinor Zoom coated f/2.8 lens (for 16mm)	349.50 Cash or 34.95 Down
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Bolex Tripod	69.50 Cash or 6.95 Down
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28mm f/3.5	$149.50 Cash or $14.95 Down
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ZEISS IKON

Single-window for rangefinder and viewfinder, metal focal plane shutter, removable back, bayonet lens mount, delayed action release, full built-in flash synchronization are just a few of the reasons for the acknowledged leadership of CONTAX! Contax II-A with Tessar coated f/3.5 lens **$261. Cash or $26.10 Down**; with Sonnar coated f/2.0 lens **$345. Cash or $34.50 Down**; or with Sonnar coated f/1.5 lens **$374. Cash or $37.40 Down**. For Contax III-A (with built-in exposure meter) add **$38. Cash or $3.80 Down.**

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Biogon 35mm f/2.8	183.00 Cash or 18.30 Down
Planar 35mm f/3.5	102.00 Cash or 10.20 Down
Trioter 85mm f/4.0	106.00 Cash or 10.60 Down
Sonnar 85mm f/2.0	229.00 Cash or 22.90 Down
Sonnar 135mm f/4.0	146.00 Cash or 14.60 Down
Stereoter C, 35mm f/3.5's	159.00 Cash or 15.90 Down
Stereo Prism Attachment	37.00 Cash or 3.70 Down
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1955 ▲ IKOFLEX

Ikoflex I-A with Novar coated f/3.5 lens in Prontor full synch' shutter **$76. Cash or $7.60 Down; Ikoflex I-A** with Tessar coated f/3.5 lens in Prontor full synch' shutter **$96. Cash or $9.60 Down**; and the superlative **Automatic Ikoflex II-A** with Tessar coated f/3.5 lens in Synchro-Compur MX shutter **$126. Cash or $12.60 Down.**

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The gem of all 35mm Single Lens Reflex cameras! Ground-glass eye-level focusing is combined with split image rangefinder. Superb Tessar 45mm coated f/2.8 lens, with fully automatic diaphragm. Contaflex I **$169. Cash or $16.90 Down**; Contaflex II (Built-in meter) **$199. Cash or $19.90 Down.**

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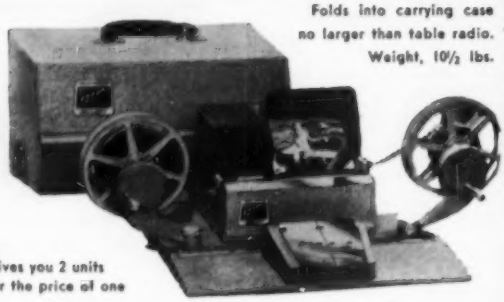
Folds into carrying case no larger than table radio. Weight, 10½ lbs.



Gives you 2 units for the price of one

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Dormitzer SYNCTRON

with the new "million prism" reflectors

New 1955 DB-SM-1 Synctron Dry Battery Unit

- **Conservative color guide number of 45; fast black and white—220.**
- **New high-efficiency GE118 flash tube.**
- **Light output—2650 lumen seconds.**
- **Weight—only 5 lbs.**
- **Size—only 8½" X 2¼" X 6½".**
- **Recycling time—5 to 8 seconds.**
- **Flash duration—1/2000th second.**
- **Batteries—expectancy of 500 flashes; replacement cost only $4.25!**

Complete price, including cord and batteries . . . $116.95 Cash or only $11.59 DOWN

Other Powerful Dormitzer Synctron Units

Model 100—Professional	$237.00 Cash or $23.70 Down
Model 200BC—Super Pro	275.00 Cash or 27.50 Down
Model 208BC—Super Candid	190.00 Cash or 19.00 Down
Model 215—Economy (A.C. only)	725.00 Cash or 72.50 Down
Model 223—Studio Light	495.00 Cash or 49.50 Down

(Prices indicated include battery and charger, except of course with A.C. Model 215.)

FREE Dormitzer Synctron brochure is yours simply by writing to DOWLING'S Fifth Avenue!

UHLER Cine Printers

. . . the standard of perfection!

Uhler 16mm Sound Cine Printer! (illustrated)

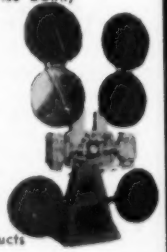
Makes contact prints of both sound and silent pictures in black and white or color. Prints picture and sound at the same time. 400' capacity; beautiful precision finish. Copies of all your favorite films can be made at about one-quarter the cost of the original. It's easy and lots of fun to make your own prints at home. Titles may be made with double exposed motion background as shown in theatres. Complete instructions are furnished with each machine.

$125. Cash or $12.50 Down

◀ (Uhler 16mm Silent Cine Printer **$95. Cash or $9.50 Down**)

Uhler Combination 8mm and 16mm Continuous Printer ▶ (illustrated)

For professional or amateur movie makers, laboratories, schools and technicians—where the highest quality prints are required. Black and white or color; single or double system sound — film is run through the machine once only. 1200' capacity. Printing speed up to 1600' per hour. Lamps are air-cooled. Built-in filter holder for color film printing.



$685. Cash or $68.50 Down

Other Uhler Precision Cine Products

Combination 35mm Continuous Printer for Sound or Silent Pictures (capacity — 6-1200' feed and take-up discs)	$1145.00 Cash or $114.50 Down
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1955 LORDOMAT

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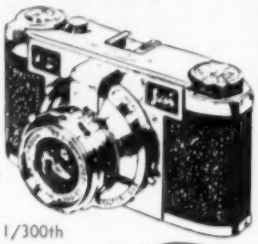

- Interchangeable lenses, all rangefinder coupled
- Rapid wind lever
- Viewfinder and rangefinder in single window
- Built-in self-timer
- Double exposure prevention mechanism
- M-X synchro shutter
- Speeds from 1 second to 1/300th second
- Complete with 50mm f/2.8 Lordon coated lens with click stops

Only $89.50 Cash or . . .

$8.95 DOWN

Lordomat Accessories

(All available from D.F.A. with 10% Down Payment)

Lordonar 35mm coated f/3.5 wide angle lens	$55.00
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Combination viewfinder for both lenses	12.50
Deluxe leather eveready case	9.95
Flashgun	7.95

1965* AUTOMATIC Exakta VX

*Yes, 1965! This is not a typographical error. It is a way of emphasizing the important giant steps forward taken by the new AUTOMATIC EXAKTA VX. Previous Exakta VX models (now usually described as "discontinued") were fine instruments. But now—almost all at once—Exakta photography has grown 10 years with the advent of the new, superb 1955 AUTOMATIC EXAKTA VX. Here are a few of its distinctive up-to-the-minute features . . .

• New safe, positive film advance • Improved shutter cocking mechanism • New exposure counter • Redesigned, easy operating, rewind • New shutter lock to prevent accidental exposures • New shutter mechanism • And—above all—a series of amazing new AUTOMATIC lenses: **One** pressure of the release button automatically closes down the lens diaphragm to a preset aperture and releases the shutter at the same time!

AUTOMATIC EXAKTA VX with automatic coated 50mm lens indicated below	Waist-level viewfinder Total	Waist-level viewfinder 10% Down	Split-image Pentaprism Total	Split-image Pentaprism 10% Down
f/2.8 Isco Westanar	$249.50	$24.95	$296.50	$29.65
f/2.0 Isco Westagon	289.50	28.95	336.50	33.65
f/2.0 Zeiss Biotar (illus.)	345.00	34.50	392.00	39.20
f/1.9 Schneider Xenon	351.70	35.17	398.70	39.87

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For 2¼ X 2¼ Single Lens Reflexes	72.50 Cash or	7.25 Down

*For this group, Bellows Attachment may be furnished on a double track for **$25. Cash or $2.50 Down additional.**

Novoflex Accessories:

400mm f/5.6 Novoflex telephoto lens (used with Bellows Attachment)	189.00 Cash or	18.90 Down
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This exceptional camera performs like a great symphony orchestra. Its splendid design is such that each component part is just "right." And the result is a smoothly performing whole instrument, fully responsive to any photographic task to which it may be assigned . . .

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- Built-in flash synchronization
- Brilliant 5-element Hexanon coated f/2.8 lens
- Above all, here is a camera that handles and "feels" just as it should!

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Leather eveready case for KONICA II	$9.75
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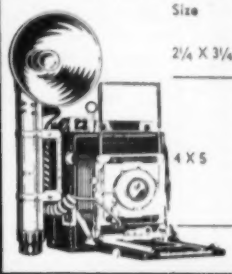

Size	Coated Lens in Shutter	Speed Graphic	Crown Graphic
2¼ X 3¼	101mm Ektar f/4.5 (1/800 sec.)	$338.	$300.
	105mm Tessar f/3.5	355.	306.
	105mm Ektar f/3.7	343.	294.
4 X 5	135mm Schneider Xenar f/4.7	337.	291.
	135mm Optar f/4.7	354.	305.
	127mm Ektar f/4.7	354.	305.
	135mm Tessar f/4.5	370.	326.
	150mm Schneider Xenar f/4.5	381.	334.
	150mm Tessar f/4.5	381.	334.
	152mm Ektar f/4.5	371.	327.
	135mm Schneider Xenar f/3.8	388.	344.
	150mm Tessar f/3.5	448.	400.
	150mm Schneider Xenotar f/2.8	568.	524.

New Graphic rangefinder is manufactured for 4 X 5 cameras only. 2¼ X 3¼ outfits are supplied with Kalart coupled rangefinder.

New 1955 Revere "888"

Automatic Projector Runs by itself! Model "553" (300 watt, automatic) $69.50 Cash or $6.95 Down; Model "555" (500 watt, automatic) $79.50 Cash or $7.95 Down; Model "888" (500 watt fully automatic) $119.50 Cash or $11.95 Down.

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1955 GRAPHIC 35

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new 1955 Voigtländer VITESSA

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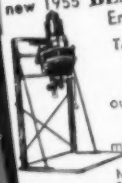
ALL NEW 1955 RETINA IIIc

Built-in exposure meter and with normal Xenon coated f/2.0 lens in M-X shutter—$185. Cash or $18.50 Down. Optional: Curtar 35mm coated f/5.6 wide angle lens $62.50 Cash or $6.25 Down; Longar 80mm coated f/4.0 telephoto lens $82.50 Cash or $8.25 Down. Retina IIc $135. Cash or $13.50 Down.

new 1955 BESELER Enlargers



Takes negatives from 16mm to 4 X 5 without changing condensers! Has automatic electric motor. 4 X 5 Model $198.75 Cash or $19.87 Down; 5 X 7 Model $239.75 Cash or $23.97 Down.

1955 Linhof Super Technika Cameras

4 X 5 model with multi-focus rangefinder, universal back and 150mm Xenar coated f/4.5 lens $419.70 Cash or $41.97 Down. Linhof 2¼ X 3¼ outfit with multifocus rangefinder and 3 lenses complete $564.15 Cash or $56.41 Down.

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stereo today

by Robert L. McIntyre

New Viewer News

Stereo's biggest thrills lie in looking at pictures, and this month we have news of three specialized viewers that have just been introduced. They aren't much alike, but each one fills a particular need.

The economy package, beyond all doubt, is the Arcadia stereo viewer. It sells for $5.95—and that includes batteries and bulb in case you are wondering. It has ground and polished lenses of surprisingly good quality for the price, and adjustments for focusing and interocular control. It has no lamp switch as such. Pressing a slide down into viewing position turns on the bulb. An ejector button on the bottom of the case is pushed to lift the slide to a point where it can be grasped easily for removal, turning out the light at the time. If you fail to turn off the lamp and place the viewer on a flat surface like a table, its own weight presses the ejector and does it for you. The unit is made by Arcadia Manufacturing Co., 3210 W. Lawrence Ave., Chicago 47, Ill.

The de luxe outfit of the month is the new Realist viewer, Model ST62, designed to retail for $24.50. It combines features that appeal to the more advanced stereo fan, the connoisseur of three-dimensional realism. Most important of them is variable illumination control, already proven popular in the Kodaslide Stereo Viewer, Model II. The new Realist unit employs a cartridge system to permit quick changeover from 110-volt operation to batteries. The light control functions only when using 110-volt current. Two cartridges come with the viewer. One, for battery operation, is merely a lightweight shell. The batteries are housed in the viewer itself and remain there regardless of the type of power being used. The other cartridge contains a rheostat and an 80-volt bulb, and has an 8-foot cord attached to it. The accompanying picture, made with the aid of a mirror, shows how the unit looks from both front and back when ready for 110-volt operation. Changing cartridges converts the viewer from one type of current to the other. It has the same 44-mm lenses employed in the original Realist ST61 unit and focusing and interocular controls that are modified slightly for ease in one-hand operation.

When a lamp is dimmed or brightened by using a rheostat, there are important changes in the color of its light as well as the intensity. As the light brightens, it becomes more blue; as it dims, it becomes more red. Fortunately, this shift in color happens to fall in the right direction to improve most slides that are too light or too dark. Underexposed pictures often are taken late in the day, or for other reasons contain an excess of red. When the light is turned up to make them appear brighter, it automatically becomes more blue. This tends to help offset the excessive red or yellow of the slide itself. An overexposed slide, on the other hand, is more likely to be bluish or at least normal. It gains by the slight warming of the tone of the illumination as the lamp is turned down for easier viewing.

The third viewer of this month's trio is designed for showing groups of slides in sequence. It is the Geiss-America GA-20, which loads with up to 20 slides that change automatically when a lever is pulled. It has interocular adjustment and knob focusing, and can be operated either on batteries or 110-volt current. It uses special lightweight slide mounts in magazines built for storage as well as to handle the slides for viewing. The price of the unit is $25, including two magazines and 20 slide mounts. It has a special appeal to the fan who wants to set up a series of slides that will almost show themselves, and also is valuable for use as a selling aid.

Here It Is—In Black-and-White

The appeal of 3-D and modern color film are so wrapped up together in today's stereo that we never think of one without the other. Every once in a while, though, you run into a stereo fan who has experimented by loading his camera with black-and-white film and has had a lot of fun doing it. He may not have taken any awards in the exhibitions with this work, but it is sure to contain some of the most prized slides of his collection.

There isn't a 35-mm direct-positive film and processing service readily available for shooting stereo in black-and-white. Most fans who have tried it prefer to use one of the fast negative emulsions used in ordinary miniature camera work. It's amazing to see the whole new range of subjects this change opens to you. "Available light" work becomes practical in stereo, even in places where the level of illumination is inherently low. The less light there is, the less you miss the color. Black shadows which seem unnatural in normal stereo shots are much less bothersome.

Negatives can be developed and then printed on positive film to get transparencies for mounting and viewing in the usual way. Another approach is to have small enlargements made on paper, about two inches square, and then to mount them on cards for viewing. One fan we know has mounted his this way and views them with the aid of the 3-D spectacles that came with his copy of Morgan & Lester's *Stereo Realist Manual*.—

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5" COLOR CORRECTED LENS

- Blower Cooled
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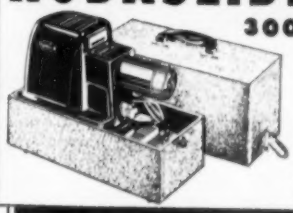

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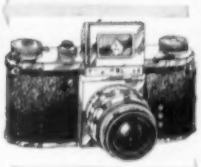

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	Value	Now
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f2.8 Coated Preset Tessar	$169.50	75.95
f2 Coated Taylor Hobson Cooke	$330.00	79.50
f2 Coated Preset Zeiss Lens	$220.00	94.95

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THREE FLASH CONTACT POINTS ON CAMERA FACE

- Built-in Synchronization for Flash and Strobe
- Combined Reflex Finder & Eye-Level Sportsfinder
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- Auto Film Transport and Shutter Cocking

PRAKTICA FX	Value	Now
f1.9 Coated Meyer	$169.50	69.50
f3.5 Coated Preset Tessar	$139.50	74.95
f2.8 Coated Preset Tessar	$169.50	77.50
f2 Coated Preset Zeiss Lens	$220.00	89.95
f2 Ctd. Taylor Hobson Cooke	$330.00	82.95

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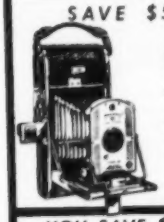
POLAROID 95



"PICTURE-IN- A- MINUTE"
with Coated Lens

- Built-in Flash Synchronization
- Focuses from 3½ Feet to Infinity
- Model '95' Takes 3¼" x 4¼" Pictures
- Model '80' Takes 2¼" x 3½" Pictures

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Ship. Wt. 10 Lbs.

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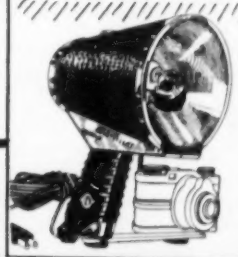

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THRIFT-LITE IIX

ELECTRONIC FLASH UNIT

- Super Fast Flash — 1/1000 Seconds
- Completely Portable
- Unit Weighs Only 1.7 lbs.
- 60 Watt Seconds
- Complete One Piece Unit

ACCESSORIES FOR THRIFT-LITE

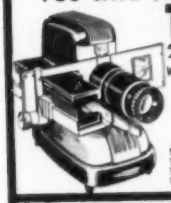
BATTERY PACK	List 24.50	Sale 14.95
EXTENSION LIGHT	List 29.95	Sale 21.00
INTENSIFIER (Doubles Light Output)	List 24.50	Sale 14.95

List $59.50!
25.95
Ship. Wt. 5 Lbs.

PLEASE STATE NAME OF YOUR CAMERA WHEN ORDERING

YOU SAVE $29.00! ON A USED FAMOUS

TDC MAINLINER



2x2 SLIDE PROJECTOR
With Selection Auto Changer

- Coated Lens
- 300-Watt Lamp
- Blower Cooling
- Fingertip Focusing

List $59.50!
30.50
Ship. Wt. 16 Lbs.

	Now	Used
TDC DeLuxe Model D, 300 Watt	67.50	37.95
TDC Duo, 500 Watt 2¼ x 2¼ x 35mm	84.50	51.95
TDC Duo, 300 Watt Projector	67.50	32.95
TDC Headliner, 200 Watt	33.50	19.95

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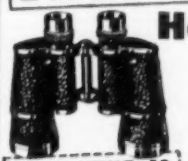

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High Magnification, Maximum Image Brightness and Large Objective Lenses Make the 7 x 50 Binocular Ideal for: • NAVIGATION • EXPLORATION • YACHTING • NIGHT VIEWING

BRAND NEW 7x50 BINOCULAR

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BOLEX H16

Latest Leader Model!
16mm MOVIE CAMERA WITH 3 LENSES

The Camera:

- Built-in Frame Counter
- Tri Focal Viewfinder
- Critical Focus Eyecup

The 3 Lenses:

- 17mm f2.7 Ctd. Wollensak W.A. Lens
- 1" f1.9 Ctd. Wollensak Lens in Focusing Mount
- 3" f4 Ctd. Wollensak Lens in Focusing Mount

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COMPLETE

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Contax II f2 Sonnar		83.95
Contax III f2 Sonnar		108.95
Contax IIA f1.5 Sonnar ¢*	374.00	188.95
Contax IIIA f2 Sonnar ¢*	383.00	193.95
Contax IIIA f1.5 Sonnar ¢*	412.00	195.95
Leica IIIC f3.5 Elmar ¢		89.95
Leica IIIC f2 Summitar ¢		119.95
Leica IIIF f3.5 Elmar ¢*	237.00	131.95
Leica IIIF f2 Summicron ¢*	336.00	177.95
Leica IIIF f1.5 Summarit ¢*	357.00	185.95
Nikon f2 Nikkor ¢*	269.00	152.95
Nikon f1.4 Nikkor ¢*	299.95	165.95

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Exa f2.8 Wester MXe	$ 85.00	$ 44.95
Kine Exakta f3.5 Tessar ¢*		69.95
Kine Exakta II f2 Biotar		99.95
Exakta V f2 Biotar MXe		129.95
Exakta VX f2.8 Auto Westanar	239.50	149.95
Exakta VX f1.9 Auto Xenon	341.70	195.95
Contaflex f2.8 Tessar Auto RF ¢*	169.00	85.95
Contax D f2 Biotar P.S. ¢*	199.00	118.95
Rectaflex f2 Xenon RF ¢*, case & shade	350.00	136.95

35mm CAMERAS

Bolsey B-2 RF, case and flash	$ 66.50	$ 39.95
Bolsey C22 f3.2 Reflex RF ¢*	99.50	66.95
Kodak 35 f3.5 RF ¢*		28.95
Kodak Flash Bantam f4.5 ¢*	56.00	28.95
Kodak Pony 828 f4.5 C*	29.50	16.95
Kodak Pony 135 f4.5 C*	29.75	17.95
Retina II f2 Xenon RF		58.95
Kodak Retina IIA RF MXe	127.50	70.95
Kodak Town & Country f3.9 RF case & flash	75.00	48.95
Minox IIIS chain & case*	139.50	84.95
Minox II f3.5¢		48.95
Robot Star f1.9 Xenon Rap Seq. ¢*	127.50	78.95
Voigt Prominent f2 RF MX ¢	220.00	130.95
Voigt Vitessa f2 RF MXe	127.50	83.95
Voigt Vito II f3.5¢*	54.50	23.95
Voigt Vito III f2 RF MX*	119.50	78.95

35mm STEREO CAMERA

Iloca II f3.5¢*	$ 69.50	$ 48.95
Kindar f3.5 RFe*	99.50	58.95
Revere f3.5 RFe*	174.50	74.95
Stereo Realist f3.5 RFe*	159.00	66.95
Stereo Realist f2.8 RFe*	198.50	118.95
TDC Colorist f3.5e*	99.99	68.95

2¼ x 2¼ REFLEX CAMERAS

Ciroflex D f3.5¢	$ 75.00	$ 46.95
Ciroflex F f3.2 MXe		66.95
Dejur f3.5¢	99.50	48.95
Graflex 22 f3.5 C*	93.00	46.95
Hasselblad f2.8 Ektar/1600 C*	476.00	278.95
Hasselblad f2.8 Ektar/1600 C*	379.50	208.95
Ikoflex IIA Auto f3.5 Tessar MXe*	126.00	73.95
Kodak Reflex II f3.5¢*		57.95
Ricohflex VI f3.5¢*	44.95	21.95
Rolleicord III f3.5 Xenar¢*		66.95
Rolleicord IV f3.5 Xenar MXe	149.50	72.95
Latest Auto Rollei III f3.5 Xenar MXe	234.50	137.95
Latest Auto Rollei III f3.5 Tessar MXe	249.50	153.95
Latest Auto Rollei 2.8 C f2.8 Xenctar MXe	309.50	182.95

ROLL FILM CAMERAS

Ansco Super Speedex f3.5 RFe*	$119.50	$ 78.95
Kodak Chevron f3.5 RF 800 MX	198.50	133.95
Kodak Medalist II f3.5 Ektar¢*	304.75	105.95
Polaroid Pathfinder f4.5 RF	249.50	146.95
Super Ikonta A f3.5 Tessar RFe*MX	99.00	55.95
Super Ikonta BX f2.8 Tessar RFe*MX	163.00	99.95
Voigt Bessa II f3.5 RF MXe	124.50	57.95

SLIDE PROJECTORS

Argus PB 300, case*	$ 48.50	$ 25.95
Gold[illegible] Manumatic 300 W.*	58.50	26.95
Gold[illegible] Coronet 300 W, case*	44.75	21.95
Gold[illegible] Reflex 300 W, case 2¼*	86.50	48.95
Kodaslide Signet 500 W*	72.50	48.95
Kodaslide Table Viewer 4x	37.50	26.95
LaBelle 55 Automatic 500 W*	95.00	49.95
LaBelle 75 Auto Remote 500 W case*	154.95	95.95
Revere 444 300 W*	69.50	30.95
TDC Headliner 300W Semimatic*	49.99	21.95
TDC Streamliner 500W Semimatic*	84.50	48.95
TDC Project-or-View 150W	69.50	46.95
TDC Project-or-View 200W*	77.50	47.95
TDC Stereo Projector 500W*	169.50	98.95
TDC Stereo Projector View 300W*	144.50	92.95
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(Symbols: RF Coupled Rangefinder, ¢ Coated, * Flash Shutter)

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HEXACON *with f2 Coated C.Z. Preset Lens*

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YOU SAVE $41.55! ON A BRAND NEW! IMPORTED FROM GERMANY

35mm WELTI I Camera

with f2.9 MEYER TRIOPLAN LENS

PEERLESS' LOW LOW PRICE . . . **25.95**

TOTAL LIST $67.50! Ship. Wt. 5 Lbs.

• 9 Shutter Speeds – 1 Sec. to 1/200 • Built-in Flash • Double Exposure Prevention • Parallax Corrected Viewfinder • Auto Film Counter • Body Shutter Release • Helical Focus Mount • Depth of Focus Scale • Tripod Socket

YOU SAVE $49.80 ON A BRAND NEW

ROLLEICORD IV

2¼ x 2¼ Twin-Lens Reflex with f3.5 Coated Xenar Lens

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35mm LEICA CAMERAS

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LEICA IIF with f2 Ctd. Summitar Lens	289.00	114.50
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USED

with f4.5 Lens **82.95**

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Save $126.95 Brand New! 4x5 Pacemaker

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with Ektalite Field Lens and Graflex Back

KODAK BC EKTALUX PRESS FLASH GUN

★ Camera with 135mm f4.7 Ctd. Gra-Rex Optar Lens ★ Kalart Rangefinder Installed ★ Kodak B.C. Ektalux Press Flash Gun with Synchro Switch and Solenoid Installed ★ Discontinued List $326.90! **199.95** Ship. Wt. 16 Lbs.

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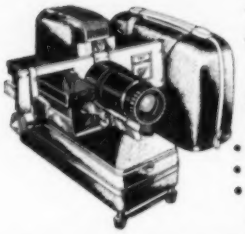

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SAVE $26.05! BRAND NEW! 300 WATT Blower Cooled Projector

TDC SHOWPAK 300

- COMPLETE WITH CASE,
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- 6 *Free* TRAYS!
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35mm Classic '35' Outfit

★ CAMERA ★ CASE ★ FLASHGUN

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- Wide Range of 9 Shutter Speeds
- Built-in Optical Viewfinder
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35mm CAMERA • GERMAN IMPORT

f2.8 COATED TESSAR

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★ CAMERA ★ CASE ★ FLASHGUN

with f3.5 Coated Lens

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8mm MOVIE PROJECTOR

- Blower-cooling
- 400 Ft. Reel
- Forward, reverse, still
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NOW ONLY **82.00**

WHILE THEY LAST!

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with f3.5 Ctd. Lenses

- Built-in Flash Synch.
- Double Exposure Prevention

List $84.50!

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LA BELLE 500

2 x 2 SLIDE PROJECTOR

f2.5 Coated Lens

- 500-Watt Lamp • Blower Cooled
- Automatically Feeds and Changes slides

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35mm CONTESSA MX

f2.8 Ctd. Carl Zeiss Tessar

- Full Flash Synch.
- Compur Rapid Shutter
- Coupled Rangefinder Speeds from 1 to 1/500

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Zeiss CONTAX IIA

with f2 Ctd. Sonnar Lens

- Focal Plane Shutter
- Full Flash Synch

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CONTAX IIA f1.5 Ctd. Sonnar List $412.00 $195.00

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with 3½" Coated Lens

- Negatives from 35mm to 2¼ x 3¼
- 75 Watt Lamp

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TAPE RECORDER OUTFIT

Complete with Microphone Case & Take-up Reel!

- Record up to 2 full hours & Plays Back to 3¾" per second
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8mm MOVIE PROJECTOR

with f1.6 Coated Lens

- 500 W Illumination
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PRESS CAMERAS

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4½ Ann. Graphic RF f4.7 lens		95.95
2¼x3¼ Century Graphic f4.5 KRF ¢*	$145.45	97.95
4x5 Super D Graflex f5.6 Ektar Auto Dia ¢*	299.50	158.95
2x3 Linhof Super Tech RF 3 lenses comp.	569.90	337.95
4x5 Linhof Super Tech RF f4.5 MX	389.75	206.95
2¼x3¼ Pacemaker Speed f4.5 KRFe*	313.95	146.95
3¼x4¼ Pacemaker Crown f4.7 KRFe*	267.45	169.95
4x5 Pacemaker Speed f4.7 KRFe*	315.45	138.95

8mm CAMERAS

B&H 134V f2.5¢	$ 89.95	$ 40.95
B&H 134TA f1.9 Turet	159.95	98.95
B&H 172 B f1.9 Mag ¢	164.95	99.95
B&H 172A f1.9 Mag. Turet	199.95	117.95
Bolex C 8 f2.8 Yvare	89.50	
B&H 252 f2.3 Montereye	59.95	38.95
Bolex L 8 f2.8 Yvare		48.95
Bolex H 8 De Luxe f1.9 Turet	365.75	246.95
Bolex 8mm Pan Cinor f2.8¢	219.50	142.95
Kodak Brownie f2.7¢	37.50	20.95
Kodak Brownie f1.9¢	46.75	31.95
Cine Kodak Reliant f2.7¢	84.50	51.95
Cine Kodak Magazine f1.9¢	149.50	68.95
De Jur Citation f2.5¢	77.50	37.95
De Jur Embassy f2.5 Mag¢	106.95	56.95
De Jur Fadematic f1.9¢	149.50	92.95
Keystone K-29 Pathfinder f2.8¢	49.95	28.95
Keystone K-30 Capri f2.8¢	54.95	33.95
Keystone K-32 Olympic f2.5¢	79.95	45.95
Keystone K-35 Olympic Tur f1.9¢	119.95	76.95
Keystone Bel Air f2.5 Mag¢	89.50	46.95
Keystone Riviera f1.9 Mag Turet	139.95	91.95
Revere 50 f2.8¢	49.50	23.95
Revere 55 f2.8¢ case	73.50	43.95
Revere 88 f2.5¢	74.00	32.95
Revere 99 f2.8 Turet	99.50	53.95
Revere 80 f2.5¢	97.50	42.95
Revere 84 f1.9 Turet	147.50	83.95
Revere 67 f2.8 Mag Turet	119.50	58.95
Revere 40 f2.5 Mag¢	99.50	52.95
Revere 44 f1.9 Mag Turet	154.50	93.95
Revere 861 f19 Mag¢	137.50	80.95
Revere 863 f2.5 Mag Turet	142.50	83.95

8mm PROJECTORS

B&H 221 500 W Case	$ 84.50	$ 49.00
B&H Regent 500 W Case	179.95	103.95
Bolex M-8 500 W Case	169.50	112.95
De Jur 750 W Case	159.50	83.95
De Jur 1000 W Cordomatic Case	177.50	104.95
Keystone K70C Brightbeam 500 W Case	69.50	39.95
Keystone K80 500 W Case	89.95	67.50
Keystone K95, 750 W., Case	119.50	68.95
Revere 85, 500 W., Case	124.50	58.95
Revere 90, 750 W., Case	159.50	66.95

(Symbols: RF Coupled Rangefinder, ¢ Coated, * Flash Shutter)

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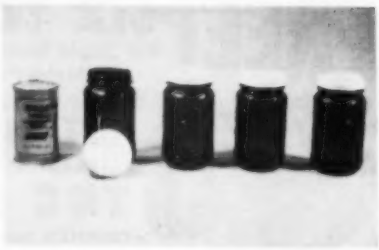
photo tips— short cuts to better pictures

Conserve Developer



Don't throw away small amber-colored jars of the type used to package instant coffee. These jars, which have an 8-oz capacity and are equipped with screw-on lids, can be put to good use in the darkroom. One quart of powdered developer can be apportioned into four of the jars and the lids closed tightly, protecting the contents and helping to conserve the developer until required. The small jars are easy to handle and take up very little space.—*Ed Goodwin, Portsmouth, Virginia.*

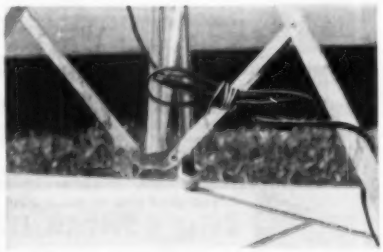
For Delicate Retouching

A phonograph needle, substituted as a retouching tool when working on small areas of a negative, has been found to produce very satisfactory results. It is particularly useful when the retouching requires etching of fine, delicate lines or obliteration of small spots. The needle should be fitted into the holder of an adjustable lead pencil or a penholder so that it will be held firmly in place while you are doing the retouching.—*W. G. Reeves, Pittsburgh, Pennsylvania.*

Substitute Fill-in Light

If you find that some of your pictures exhibit double shadows, shadows within shadows, or contrasts that are too strongly marked, this may indicate that your fill-in lights were too bright or insufficiently diffused. For many shots, the lamphouse from a fluorescent cold-light enlarger, mounted on a light-stand or tripod, will provide greater diffusion and less brightness than an incandescent fill-in, and is fairly cool to work with.—*J. L. Stanley, Oak Park, Illinois.*

End Wiring Tangles



In lighting setups where a number of electric cords must be used, the trailing cords hamper shifting of equipment and there is danger of someone tripping over them. A generous length of rosin-core solder will do an excellent job of holding them in place, securing the loops of excess cord to a light-stand, as shown here. The solder bends easily and holds firmly. It should be crimped with pliers at both ends to seal rosin in the solder.—*Alvin A. Geyer, Pasadena, Texas.*

For Small Accessories

Remove flashlight batteries and bulb from a discarded penlight and you will have a handy case for compact storage of retouching accessories. It requires a minimum of space and can be carried easily in pocket of suit or shirt. This slim case will hold tweezers, applicator sticks, and camel's-hair brushes—the handles of which have been shortened. The bulb end may be used for cotton, which can be removed with tweezers as needed.—*John J. Rea, Urbana, Illinois.*

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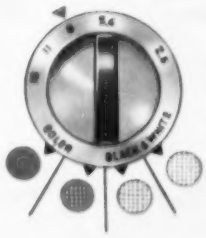

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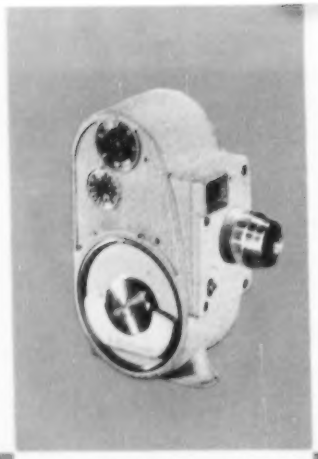

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The kind of 8mm movie camera that you'll love to use—it's so lightweight and easy to carry—so easy to operate. Drop-in spool loading, built-in exposure guide, four filming speeds. With 0.5-inch f/2.5 lens, a Bell & Howell standout value . . . **$79.95.**

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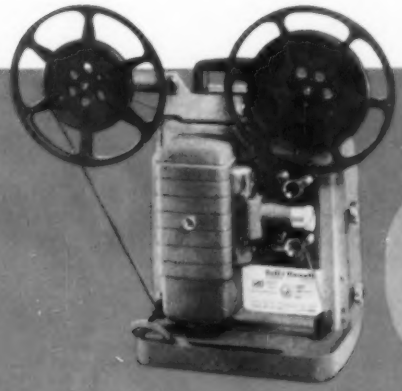

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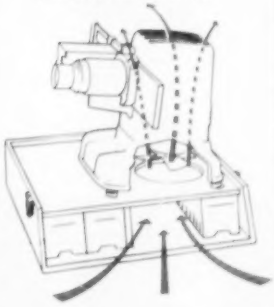

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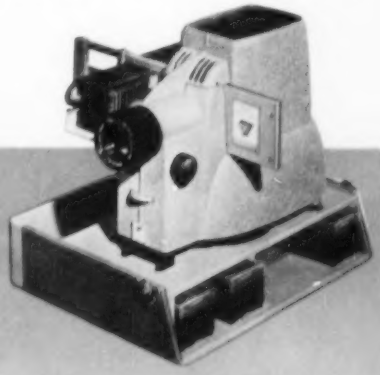

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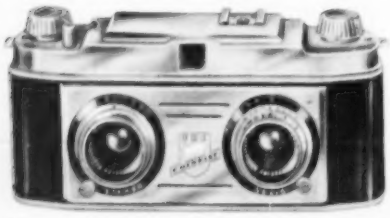

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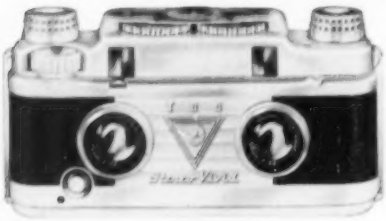

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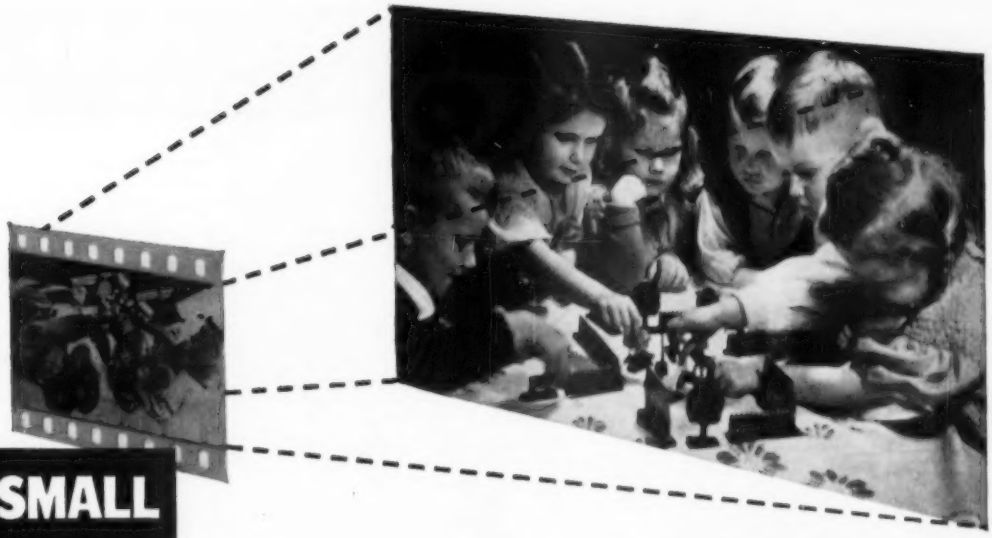

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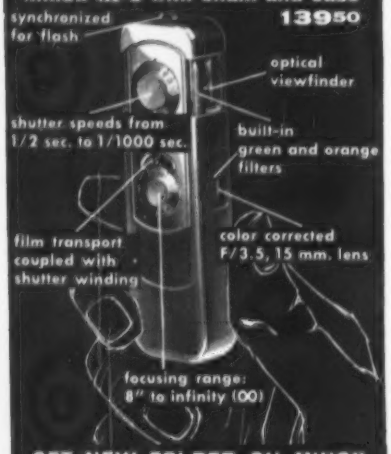

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by Whit Hillyer

Do Your Club a Good Turn

One very fine antidote to the hot-rod movement, or Teen-age Accident About to Happen, is organized photographic activity at the high-school level. Kids always will want to try something daring or unusual, which is why they sometimes see how quickly the family crate will reach 40 mph from a standing position, why they barrel through intersections without a care in the world, and why they fool around with dual exhausts and such. They instinctively take something mechanical and see just what improbable feats they can accomplish with it.

Today's photographic equipment offers quite a challenge of this kind, without boosting your auto-insurance rates any higher. And daily more teen-agers of both sexes are getting a large charge out of attempting the impossible with lenses, shutters, and film. It can be quite a rewarding thing—as many of us graybeards know—to capture on film just the right moment of a sporting event, or to somehow succeed in making a good color shot when the odds are all against it. Available-light studies made during a real-gone instant in a jam session can be the most, to say the least.

The youngsters' resourcefulness with cameras is making itself known. At our local high school the student cameramen nonchalantly cover athletics and social events with their strobe and press-camera outfits. They work like veterans and come up with some great stuff. And there are thousands like them.

Movies figure in this thing, too. Now that magnetic sound-on-film is with us, many high-school groups are turning out truly interesting sound films, some of them adventures in art, others documentary.

Even those who don't work at picture-taking know the value of a photograph. One of my sons covers sports for his college daily. This spring he got a rush assignment to interview a visiting sports luminary from overseas. No staff cameraman was available at the moment—so the boy grabbed his cheap, miserable reflex box and snapped a picture as he interviewed the visitor. I don't know exactly how the film got processed and printed in time for the deadline, but it did. The picture was a good one and added much to the coverage.

High-school camera clubs are increasing at a fast clip. They are producing pictorial work and reportage which stacks up very well against much of the adult output. It behooves every adult photographic group to show a genuine —*not* a paternalistic— interest in the teen-age photographers in its community. Once you start doing this, you have a steady stream of new blood flowing into your ranks. Perhaps the youngsters need your guidance and encouragement. Perhaps they can show you a thing or two. In either case, get to know them.

Frequently my mail contains requests for advice on how to start a high-school photographic society. We've tried to condense such advice in a booklet, entitled *How to Organize and Run a High School Camera Club*. A copy is available for anyone seriously interested in the matter. Right now is a good time to get the program lined up for the fall school term. So, whether you're a teacher, a potential high-school club sponsor, or an interested student, drop me a line, and the booklet is yours.

Two Methods of Judging

For those clubs still seeking proper ways and means of judging pictures, here are a couple of ideas which may prove helpful.

Boston Camera Club gets a comprehensive cross section of opinion with its new electric voting machine, which was designed and built by member Allen Stimson. Each judge holds a small box containing an illuminated knob and scale which can be set for any percentage between 30 and 100. When all votes are cast, the machine indicates the average on a dial which is located on a control box at the back of the hall. From five to ten people can judge simultaneously with this setup. (Have you an electronics engineer among your group?)

Richmond (Calif.) *View Finders* operate as follows with a guest judge: All prints are placed on viewing racks, at random. The judge first separates them into standard, advanced, and salon groups, according to merit. Then he picks the winner in each group. Thus, instead of the maker being placed in a group, the *print* is. The *View Finders* report that on occasion one entrant has placed in all three groups. This system eliminates any collection of points or other need for moving an entrant from one group into another. The method has brought a noticeable increase in number of prints entered on competition night.

We hear that editor W. Davidson of the "Rhodesian Picture Maker" (*Mashonaland Photographic Society*) has had to relinquish his duties. He'll be missed, I know—he got his club publication off to a very fine start. Haven't as yet heard who succeeds him, but whoever it is we welcome him to the fraternity.

Famous last words: "Could those clouds possibly have been printed in from another negative, I wonder?"

Madras Amateur Photographic Society has resumed its PSA affiliation. Madras' "Lenslight" is a well-done printed bulletin. Editor is Dr. D. Damoder Das, YMIA Buildings, 9 Armenian St., Madras 1, South India.

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125mm f2.5 Hektor ¢	147.00	96.50	70.00
135mm f4.5 Leitz Hektor Blk		63.95	40.00
135mm f3.5 Nikkorg	145.00	85.00	62.00
135mm f4 Serenar ¢	108.00	69.00	50.00
135mm f4 Sonnar ¢	146.00	88.00	65.00
200mm f4.5 Telyt ¢	156.00	104.00	75.00
300mm f5.6 Kilar ¢	149.95	97.50	70.00
400mm f5.6 Novoflex ¢	118.50		85.00

Lenses for EXAKTA, CONTAX D, PRAKTICA, PENTACON

	New	Used	Trade-in
28mm f3.5 Angenieux ¢	$126.00	$ 73.95	$ 60.00
35mm f2.5 Angenieux ¢	99.50	56.95	45.00
40mm f3.5 Casseron ¢	49.50	31.00	20.00
40mm f3.5 Makro-Kilar Model D ¢	114.95	78.50	60.00
50mm f2.8 Westanar Auto Diag.	69.50	44.50	30.00
50mm f1.9 Xenon Auloq	169.50	119.00	85.00
58mm f2 Biotar ¢		49.00	30.00
50mm f2 Biotar preset ¢	125.00	63.95	45.00
75mm f1.5 Biotar ¢	216.50	93.95	70.00
85mm f1.5 Lithogon	179.50		85.00
90mm f2.5 Angenieux ¢	94.50	58.50	40.00
90mm f1.8 Angenieux ¢	149.50	95.95	75.00
90mm f4 Sun ¢	51.95	24.50	18.00
90mm f4 Sun preset ¢	64.95	33.50	25.00
135mm f2.5 Angenieux ¢	89.50	54.50	30.00
135mm f4.5 Steinheil ¢	60.00	37.00	22.00
135mm f3.8 Sun ¢	59.50	29.50	20.00
135mm f3.5 Sun preset ¢	74.95	36.50	25.00
135mm f3.5 Tele Colnar preset ¢	84.95	44.00	30.00
135mm f4.5 Tele Xenar ¢	84.95	49.50	35.00
150 mm f5.5 Tele Xenar ¢	64.95	39.50	30.00
240mm f5.5 Tele Xenar ¢	115.75	78.00	55.00
360mm f5.5 Schneider Tele Xenarg	169.95	98.00	75.00
400mm f5.5 Tele Megor	134.50	97.50	75.00
400mm f5.6 Novoflex ¢	189.50		85.00
400mm f5.5 Tele Megorg. Preset	199.50	137.50	100.00

ACCES. FOR IMPORTED CAMERAS

	New	Used	Trade-in
Leitz Adapter for Leica M3	$ 10.50		
Leitz Focaslide	36.00	$23.00	$15.00
Leitz Imarect Finder	39.00	24.00	16.00
Leitz B.C. Flashgun	24.00	16.95	12.00
Leitz Mirror Reflex Housing	102.00	69.00	50.00
Zeiss Revoiv. Univ. Finder	80.00	42.75	30.00
Zeiss Contameter Close-Up	81.00	43.00	30.00
Novoflex Bellows for Leica, Contax	34.50		15.00
Novoflex for Exakta, Pentacon, etc.	34.50		15.00

LEICA CONTAX NIKON CANON

	New	Used	Trade-in
Canon IV S 2 f1.8 Serenarg*	$284.00	$144.00	$120.00
Contax I f2.8 Tessar		46.00	25.00
Contax I f2 Sonnar		59.00	35.00
Contax II f2 Sonnar		83.95	65.00
Contax III f2 Sonnar		109.00	80.00
Contax IIA f2 Sonnar ¢*	345.00	167.00	125.00
Contax IIA f1.5 Sonnar ¢*	374.00	189.50	145.00
Contax IIIA f2 Sonnar ¢*	383.00	194.50	150.00
Contax IIIA f1.5 Sonnar ¢*	412.00	196.00	196.00
Leica IIIA f2 Summar		84.50	65.00
Leica IIIC f3.5 Elmar ¢		92.00	70.00
Leica IIIC f2 Summitar ¢		124.00	100.00
Leica IIIF f3.5 Elmar ¢*	237.00	152.00	120.00
Leica IIIF f2 Summitar ¢*	268.50	147.50	125.00
Leica IIIF f2 Summicron ¢*	336.00	183.00	155.00
Leica IIIF f1.5 Summarit ¢*	357.00	196.95	175.00
Leica M3 f2 Summicron ¢*	447.00		220.00
Leica M3 f1.5 Summarit ¢*	468.00		230.00
Nikon S2 f2 Nikkor ¢			150.00
Nikon S2 f1.4 Nikkor ¢*	345.00		170.00
Nikon f2 Nikkor ¢*	269.00	154.00	105.00
Nikon f1.4 Nikkor ¢*	299.95	167.50	125.00

DO IT YOURSELF AND SAVE!

DEVELOP AND MOUNT YOUR OWN EKTACHROME

Kit E1—Develops 6 rolls 120/620 ..... $1.05
Kit E2—1 Qt. develops 6 rolls, 20 Exp. 35mm. 1.80
Kit E2—½ Gal. develops 24 rolls, 20 Exp. 35mm. 4.80

ANSCO or ANSCOCHROME DEVELOPING KITS

Developer for 4 Rolls $1.95
Developer for 8 Rolls 2.95
Developer for 32 Rolls 7.25
2x2 Cardboard Mounts ..... 25¢ per Dozen

SHOOT ANSCOCHROME AT A.S.A. 125

WHEN YOU DEVELOP WITH OUR SPECIAL HIGH-SPEED KITS

4 Rolls 20 Exp. ANSCOCHROME — all for
Developer for 4 Rolls — $8.75
80 Cardboard Mounts

8 Rolls 20 Exp. plus Developer & 160 Mounts $13.95

28 ft. 35mm ANCOCHROME—including a Daylight Bulk Film Loader—8 cartridges—8 mailing bags—Developing & Printing (Tongued for 8-20 exp. rolls, frame numbered). **All for $14.75**

28 ft. 35mm EKTACHROME—with 8 free cartridges, 8 mailing bags—including Developing & Printing (Frame numbered). **All for $16.75**

35MM SINGLE LENS REFLEX

	New	Used	Trade-in
Alpa 7 f1.8 Switarg*	$459.00		$200.00
Contaflex f2.8 Tessar Auto R.F.	169.00	86.50	70.00
Exa f2.8 Westar MXg	85.00	45.95	35.00
Kine Exakta f3.5 Tessar ¢*		72.50	50.00
Exakta VX f2 Automatic Biotar R.F. ¢	392.00	224.00	180.00
Exakta V f2 Biotar MX		119.00	100.00
Exakta VX f2.8 Auto Westanar	239.50	156.00	125.00
Exakta VX f1.9 Auto Xenon	341.70	197.00	155.00
Exakta VX f2. Auto Westagon	279.50	169.00	140.00
Contaflex II f2.8 Tessar Auto R.F. ¢ meter	199.00	129.00	95.00
Contax D f2 Biotar P.S.¢*	199.00	119.00	80.00
Pentacon f2 Biotar pre-set*	249.50	129.00	100.00
Praktica FX f2.8 Westar MXg	99.50	42.50	30.00
Praktica FX f2 Biotar P.S.MX	169.50	84.00	65.00
Praktiflex f2 Biotar ¢	89.00	69.00	45.00

35MM CAMERAS

	New	Used	Trade-in
Argus C-3 RF case and flash	$ 66.50	$ 32.00	$ 28.00
Argus C4 f2.8 RF MX	84.50	46.00	35.00
B&H Foton f2 RF MX	498.00	265.00	200.00
Bolsey Jubilee f2.8 Setomatic R.F. Case and flash	79.50		40.00
Bolsey B22 f3.2 RF ¢*	69.50	35.50	30.00
Bolsey C f3.2 Reflex RF ¢*	89.50	38.95	30.00
Kodak Bantam R.F. f3.9 ¢	56.75	39.50	30.00
Clarus f2.8 RFg*		37.50	20.00
Contessa f2.8 RF meter MXg*		85.95	60.00
Kodak 35 f3.5 R.F.		29.95	20.00
Kodak Retina IIC f2.8 R.F. ¢	135.00	105.00	65.00
Kodak Retina IIIC f2 R.F. ¢	185.00	117.00	85.00
Kodak Pony 828 f4.5 C*	29.50	17.00	12.00
Kodak Pony 135 f4.5 C*	29.75	18.00	12.00
Graphic 35 f3.5 R.F. Case & Flash	89.50		45.00
Retina II f2 Xenon RF		59.00	40.00
Kodak Retina IIA RF MXg		71.50	60.00
Kodak Signet f3.5 Ektar RFC*	70.00	44.00	35.00
Minox IIIS chain & case*	139.50	85.00	60.00
Minox II f3.5g		49.50	30.00
Mercury II f2.7g*	41.50	18.95	12.00
Robot Royal f1.9 Xenon R.F.	295.00	168.50	135.00
Robot II f2 Biotar Rap Seq.		54.00	30.00
Robot IIA f1.9 Xenon Rap Seq.¢*	89.50	57.00	40.00
Robot Star f1.9 Xenon Rap Seq.¢*	127.50	79.50	55.00
Voigt Prominent f2 RF MXg	220.00	131.50	100.00
Voigt Prominent f1.5 RF MXg	270.00	136.95	105.00
Voigt Vitessa f2 RF MXg	127.50	84.00	55.00
Voigt Vito II f3.5g*	54.50	29.50	22.00
Voigt Vito III f2 RF MX*	119.50	79.50	55.00
Voigt Vitessa L f2 R.F. MX	159.50	107.50	75.00
Voigt Vito B	54.50	34.00	25.00

35MM STEREO CAMERAS

	New	Used	Trade-in
Kodak f3.5g*	$ 84.50	$ 50.95	$35.00
Revere f3.5 RFg*	174.50	76.00	60.00
Realist 45 f3.5 ¢	88.50		40.00
Stereo Realist f3.5 RFg*	159.00	66.50	55.00
Stereo Realist f2.8 RFg*	192.50	119.00	95.00

2¼x2¼ REFLEX CAMERAS

	New	Used	Trade-in
Ciroflex D f3.5g	$ 75.00	$ 47.00	$ 25.00
Ciroflex E f3.5/400g*	99.50	58.00	35.00
Ciroflex F f3.2 MXg		67.50	45.00
Graflex 22 f3.5 C*	93.00	47.00	35.00
Hasselblad Super Wide Angle f4.5	489.50	369.50	270.00
Hasselblad f2.8 Ektar /1000 C*	379.50	208.00	175.00
Ikoflex IIA Auto f3.5 Tessar MXg*	126.00	74.95	60.00
Kodak Reflex I f3.5g*		36.95	25.00
Kodak Reflex II f3.5g*		57.50	40.00
Ricohflex VI f3.5g*	44.95	22.00	15.00
Rolleicord V f3.5 Xenar MX ¢	134.55	99.50	70.00
Rolleicord III f3.5 Xenarg*		67.50	45.00
Rolleicord IV f3.5 Xenar MXg		66.95	55.00

EKTACHROME (35mm 20 exp. — 3 times as fast as Kodachrome)

1 Roll (Daylight or Indoor)	1.85
Developing and Mounting	1.25

ORIGINAL KODAK FACTORY PACKAGE

Reg. Price 3.10
Our Price 2.85
3 Rolls for 7.50

ANSCOCHROME

35mm — 20 Exp. FACTORY PACKED
1 Roll $2.75 — 3 Rolls $7.25
Price Includes Dev. & Mtg.

120-620 ANSCOCHROME

1 Roll ..... $1.95 — 3 Rolls $5.50
Size 828—3 Rolls $4.75

35mm EKTACHROME / ANSCOCHROME RELOADS

These Reload Cartridges are Laboratory packed and Quality Controlled by MINIFILM in its own Air Conditioned Darkrooms. Twenty and 36 Exposure Cartridges are manufactured daily from 100 ft. rolls received fresh from Eastman Kodak and Ansco. Careful supervision and tremendous sales turn-over insures your getting reloads which are equal in quality and freshness to cartridges packed at the factory. THE ONLY THING DIFFERENT IS THE PRICE. Take a tip from film-wise professionals . . . USE MINIFILM 1956 DATED RELOADS. Daylight or Indoor.

ANSCO CHROME			EKTACHROME		
20 Exp.	Daylight or Indoor	36 Exp.	20 Exp.	Daylight or Indoor	36 Exp.
1 Roll ..2.50		1 Roll ..3.75	1 Roll ..2.50		1 Roll ..3.85
3 for ..6.50		2 for ..6.95	3 for ..6.95		2 for ..7.35

ALL PRICES ABOVE INCLUDE DEVELOPING AND MOUNTING

PLEASE INCLUDE 20c EXTRA FOR POSTAGE ON ALL FILM ORDERS

KODACHROME

Factory Packed
35mm 20 Exp. Daylight or Type A
3 Rolls 5.55—6 Rolls 10.50

KODAK'S MIRACLE TRI-X

35mm
20 Exp. 6 Rolls $1.99—10 for $3
36 Exp. 4 Rolls $1.99—7 for $3.15
50 feet $2.45 — 100 feet $3.95

SALE! SALE! #535

35mm — 20 Exp. — ANSCO COLOR
1956 DATED — FRAME NUMBERED

Prices Below Include Developing And Custom Mounting		Prices Below Without Developing	
1 Roll	1.85	1 Roll	1.15
3 Rolls	4.85	3 Rolls	2.95
6 Rolls	9.50	6 Rolls	5.25
10 Rolls	14.95	10 Rolls	8.29

#535 28 FT. BULK ANSCO COLOR
TONGUED — FRAME NUMBERED
SEALED CANS — 1956 DATED

Prices Below Include Developing And Printing As Ready		Prices Below Without Developing	
1 Can	11.95	1 Can	6.75
2 Cans	22.75	3 Cans	18.25
3 Cans	33.00	5 Cans	28.50

8 Free Cartridges Per Each Can
Enclose Postage — 10¢ per can.

10% MONTHLY

30 DAY FREE TRIAL

2 YEAR SERVICE GUARANTEE

MINIFILM'S EXCLUSIVE "PUBLISHED TRADE-IN ALLOWANCES" are the HIGHEST OFFERED ANYWHERE!

To get the right deal, HERE'S ALL YOU HAVE TO DO

1. Select the equipment of your choice at the prices shown in column one for new equipment or column two for used equipment.
2. If you have equipment to trade, check it it is represented in listing and deduct the allowance shown for it in column three.
3. Rush your order (and trade-in equipment if you have such) plus your remittance to cover—or instructions to ship C.O.D. for the balance or deferred payment terms as per your instructions.

MINIFILM will immediately forward the equipment you desire. Of course your order will be fully insured. OUR FAMOUS 30 DAY MONEY BACK GUARANTEE AND 2 YEAR SERVICE GUARANTEE ASSURES YOU OF COMPLETE SATISFACTION.

Auto Rollei f3.5 Tessar		88.95	65.00
Auto Rollei IIB f3.5 Xenar¢*		98.50	75.00
Auto Rollei IIB f3.5 Tessar¢*		107.50	85.00
Auto Rollei IIB f2.8 Tessar¢*		149.50	100.00
Auto Rollei III f3.5 Xenar MX¢	217.50	116.95	100.00
Auto Rollei III f3.5 Tessar MX¢*	232.50	126.95	110.00
Tele Koniflex II f3.5 Normal plus 135mm f4.5 Telephoto	289.50		150.00
Auto Rollex 2.8 C f2.8 Xenctar MX¢	291.50	183.50	150.00

ROLL FILM CAMERAS

	New	Used	Trade-in
Kodak Cheyron f3.5 RF 800 MX	$198.50	$129.50	$100.00
Kodak Medalist I f3.5 Ektar		56.00	40.00
Kodak Medalist II f3.5 Ektar 4*		111.50	75.00
Omega 120 f3.5 Omicron R.F. MX	239.50		130.00
Polaroid Highlander	69.95	42.50	30.00
Polaroid Landg*	89.75	39.00	30.00
Polaroid Pathfinder f4.5 RF	249.50	148.95	120.00
Super Ikonta B f2.8 Tessar RF g*	139.00	87.50	65.00
Super Ikonta BX f2.8 Tessar RFg*	163.00	102.00	75.00
Super Ikonta C f3.5 Tessar RFg*	114.00	59.00	45.00
Super Ikonta III f3.5 Tessar R.F. MX	120.00	77.50	55.00
Voigt Bessa II f3.5 RF MXg	124.50	68.95	50.00

PRESS CAMERAS

	New	Used	Trade-in
23 Ann. Graphic RF f4.5 lens		$ 83.95	$ 55.00
45 Ann. Graphic RF f4.7 lens		96.00	75.00
2x3 Linhof Super Tech RF 3-lenses comp.	$569.00	338.00	280.00
2¼ x3¼ Bertram f3.5 Xenar Multifocus R.F.	495.00	339.50	240.00
4x5 Linhof Super Tech RF f4.5 MX	389.75	207.00	165.00
2¼ x3¼ Pacemaker Speed f4.5 KRFg*	313.95	147.59	120.00
3¼ x4¼ Pacemaker Crown f4.7 KRFg*	267.45	139.00	100.00
4x5 Pacemaker Speed f4.7 KRFg*	315.45	172.50	130.00
4x5 1955 Pace Crown f4.7 Multifocus R.F.	287.50		150.00
4x5 B&J Press f4.7 Kalart R.F.	197.50	89.50	60.00

SLIDE PROJECTORS

*Blower cooled	New	Used	Trade-in
Argus Automatic 300W* Case	$66.50	$43.50	$30.00
Argus PB 300, case*	48.50	26.00	20.00
GoldE Manumatic 300 W.*	58.50	26.00	20.00
GoldE Coronet 300 W, case*	44.75	22.00	15.00
Kodaslide Merit 150 W	26.10	16.50	10.00
Kodaslide Signet 300W*	59.50		30.00
Kodaslide Signet 500 W*	72.50	49.00	35.00
Kodaslide Table Viewer 4x		27.00	20.00
LaBelle 22 Automatic 200 W *	69.00	46.50	35.00
LaBelle 55 Automatic 500 W *	95.00	54.00	40.00
LaBelle Director 300W Auto*	59.50		30.00
Nord Stereo 300 W*	99.50	69.00	50.00
Revere 555 500W Auto Case	79.50		40.00
Revere 888 500W Auto Remote Case	119.50		60.00
Revere 444 300 W*	69.50	31.00	22.00
SVE Instructor 300 W slide & strip *	89.50	57.50	40.00
TDC Headliner 300W Semimatic *	49.99	28.50	20.00
TDC Mainliner 300W Semimatic*	59.50	30.95	25.00
TDC Model D 300W Semimatic*	67.50	35.50	28.00
TDC Duo 300W 2¼ *	67.50	35.00	28.00
TDC Duo 500W 2¼ *	84.50	52.50	40.00
TDC Project-or-View 200W*	77.50	48.00	35.00
TDC Stereo Projector 500W*	169.50	98.50	75.00
TDC Stereo Projector View 300W*	144.50	96.50	70.00
Viewlex V33L 300W Auto*	67.00	39.95	30.00
Viewlex V35L 500W*	79.95	47.50	35.00

8MM CAMERAS

	New	Used	Trade-in
B&H 134V f2.5g	$ 89.95	$ 40.00	$ 30.00
B&H 177 B f1.9 Mag g	164.95	101.00	80.00
Bolex C 8 f2.8 Yvarg	89.50		40.00
B & H 252 f2.3 Montereyg	59.95	39.00	28.00
Bolex B8 f2.8 Yvar Turg	119.50	69.00	55.00
Bolex H8 Leader f1.9 Turg	259.50	144.95	115.00
Bolex 8mm Pancinor f2.8g	219.50	144.00	110.00
Kodak Brownie f2.7g	37.50	21.95	15.00
Cine Kodak Magazine f1.9g	149.50	87.00	60.00
De Jur Citation f2.5g	77.50	38.00	30.00
De Jur Fadematic f1.9g	149.50	93.00	65.00
Keystone K-30 Capri f2.8g	54.95	34.50	25.00
Keystone K-32 Olympic f2.5g	79.95	46.00	30.00
Keystone Bel Air f2.5 Magg	89.50	52.00	35.00
Revere 50 f2.8g	49.50	24.00	18.00
Revere 88 f2.5g	74.00	33.50	25.00
Revere 80 f2.5g	97.50	44.00	35.00
Revere 84 f1.9 Turg	147.50	84.00	70.00
Revere 67 f2.8 Mag Turg	119.50	59.50	40.00
Revere 40 f2.5 Magg	99.50	53.00	40.00
Revere 44 f1.9 Mag Turg	154.50	93.50	65.00
Revere 861 f1.9 Magg	137.50	81.50	60.00
Revere 863 f2.5 Mag Turg	142.50	84.00	58.00
Vistascope Outfit, Case	75.00		40.00
Zoomar 8 f2.8 Lens	199.00		110.00

8MM PROJECTORS

	New	Used	Trade-in
Ampro Futurist 750W case	$149.95	$ 84.50	$60.00
B&H Monterey 500 W Case	99.50	49.95	35.00
B&H Regent 500 W Case	179.95	104.00	80.00
Bolex M-500 W Case	169.50	114.00	85.00
De Jur 750 W Case	159.50	84.00	65.00
De Jur 1000 W Cordomatic Case	177.50	105.00	85.00
Keystone K70C Brightbeam 500 W Case	79.95	57.00	
Keystone K109 750 W Splicer Case	159.50	88.00	65.00
Keystone K100 500W Case	99.95	69.00	50.00
Keystone K95 M 750W Case	127.95	84.00	65.00
Keystone K109M 750W Case	167.50	94.00	75.00
Kodak Brownie 300 W Case	62.00	39.50	30.00
Kodascope 8-71A 1000 W	110.00	72.50	50.00
Revere 777 750W Case	127.50		60.00
Revere 85 500 W	114.50	59.25	45.00
Revere 90 750 W	125.00	67.00	50.00

MINIFILM COLOR LABORATORIES

SPARKLING COLOR PRINTS

2x3¼—Usually 35c—Our Price 25c ea.
2½x3¼—Usually 54c—Our Price 25c ea.
3¼x4 —Usually 75c—Our Price 47c ea.
4x5 —Usually 1.00—Our Price 57c ea.
5x7 —Usually 1.50—Our Price 89c ea.
8x10 —Usually 3.00—Our Price 1.85 ea.

24 HR. COLOR FILM DEVELOPING

35mm Ansco mounted, $1.00—3 for $2.70
35mm Ektachrome, $1.25—3 for $3.25
120/620 Ektachrome or Ansco—$1 per roll

SLIDE DUPLICATES 5 FOR 1.00—25 FOR 4.00

LOAD YOUR OWN 35mm ANSCO CHROME (SO QUICK — SO EASY — SO ECONOMICAL) A CHILD CAN LOAD A ROLL IN 90 SECONDS! A 20-EXP. ROLL COSTS ONLY $1.11

1. A Daylight Bulk Film Loader
2. 28 ft. of Ansco Chrome—enough for 8 rolls (tongued—frame numbered—1956 date)
3. 8 Brand new casettes. 4. 8 Mailing bags.

ALL FOR ONLY 8.88

ELECTRONIC FLASH

	New	Used	Trade-in
Ce Be I Portable	69.95	29.50	20.00
Dormitzer DB I Portable	109.50	49.50	30.00
Dormitzer 207 Battery & Charger	140.00	79.00	50.00
Heiland III AC, Portable	197.50	97.50	50.00
Heiland IV	369.50	209.00	130.00
Heiland V	119.50	69.00	45.00
Mighty Lite AC	49.50	35.00	20.00
Mighty Lite Port.	69.50	49.00	30.00
Strobo II flash, Port.	115.00	69.00	40.00
Strobo III flash, Port.	159.95	109.50	70.00
Sunlite II model 225 Port.	79.50	49.50	35.00
Sunlite II model 110 AC	62.50	39.50	25.00
Sunlite II Pocket Pak Port.	89.50	57.50	35.00
Sunlite flash saver AC	39.95	24.50	15.00
Ultrablitz Expert IIM Port. AC	Special 49.50		
Dormitzer 208B Port. w/charger		180.00	75.00
Dormitzer 209B Port. w/charger		275.00	125.00
Limelite 60 Port.		99.50	45.00
Sunlite "500" Port.		49.50	20.00
Sunlite III Port. AC		139.50	55.00
Heiland VI Port.		141.60	60.00
Heiland VII Pro-Pak Port.		55.95	30.00
De Jur Port.		39.95	20.00
Leitz Braun-Hobby Port.		89.95	
FR Port.		54.95	25.00

TAPE RECORDERS

2 speed 3¼ and 7½ Inches per second
7½ 7½ Inches per second
3¾ 3¾ Inches per second
1⅞ 1⅞ Inches per second
TR Tape Recorder and Radio

	New	Used	Trade-in
Ampro 731R 3¼ 7" Reel		$ 49.00	$ 25.00
Ampro Hi-Fi 2 Speed 7" Reel	239.95	139.50	105.00
Federal FME 2 speed 7" Reel	139.50	86.00	60.00
Pentron 9T-3C 2 speed 7" Reel	189.50	99.50	85.00
Pentron HT 225 s speed 7" Reel	225.00	132.50	105.00
RCA 402 2 Speed Remote Control	229.95	159.00	110.00
RCA SRT301 2 speed 7" Reel		99.50	70.00
Revere T100 3¼ 5" Reel	169.50	74.50	50.00

16MM CAMERAS

	New	Used	Trade-in
Auricon Cine Voice f1.9g	$ 749.00	$536.00	$350.00
Arriflex 16 (complete 3 lenses)	1990.00	1300.00	1000.00
Bell and Howell Automaster Mag Tur f1.9		129.00	100.00
B&H 200 f2.5 Magg	174.95	108.00	85.00
B&H 200T f1.9 Mag Turg	244.95	157.00	125.00
B&H 70DA f1.9 Tur		149.00	110.00
B&H 70 DL f1.9 Turg	365.50	216.00	175.00
Bolex Stereo		145.00	75.00
Bolex H16 Leader f1.9 Turg	269.50	149.00	120.00
Bolex H16 Leader (3 lenses compl)g	399.45	229.95	180.00
Bolex H-16 De Luxe f1.4 Tur Octarefrg	486.00	295.00	225.00
Bolex Pan Cinor f2.8 caseg	349.50	199.00	165.00
Cine Kodak K100 f1.9	269.00		130.00
Cine Kodak Mag. f1.9		57.00	45.00
Cine Kodak Royal Mag. f1.9g	169.50	104.50	80.00
Cine Kodak Special II f1.9g Tur	390.00	599.00	400.00
Keystone A15 Newport f1.9 Turret	199.50		100.00
Eigent Stereo Outfit Complete Spec.	89.50	69.50	50.00
Keystone A-9 f2.5g	99.50	57.50	40.00
Keystone A12 f1.9 Turg	159.50	97.00	70.00
Keystone K50 f2.5 Magg	129.50	82.50	60.00
Keystone K55 f1.9 Mag Turg	175.00	117.00	80.00
Pathe Super 16 Turg	450.00	229.00	180.00
Revere 16 f1.9 Magg	182.50	87.00	60.00
Revere 26 f1.9 Mag Turg	212.00	105.00	70.00
Revere C101 f2.5	139.50		70.00
Revere C103 f1.9 Turret	194.50		95.00
Revere 36 f2.5 Mag	139.50		70.00
Victor IV f1.9 Tur		99.00	65.00
Vistascope Outfit Case	175.00		65.00
Zoomar 16 f2.8	600.00	395.00	300.00

16MM PROJECTORS

	New	Used	Trade-in
Ampro Imperial 1000 W case	$799.50	$197.00	$150.00
Bolex G-8 16 750 W (8mm & 16mm)	339.50	235.00	150.00
B&H 273A Statesman 750 W Case	199.95	117.50	90.00
B&H 173 Diplomat 1000 W Case	299.95	185.00	135.00
Keystone A82 750 W Case	139.50	75.50	60.00
Keystone K161 750 W Splicer Case	159.50	85.00	65.00
Kodascope Royal 1000 W	240.00	164.00	115.00
Revere 48 750 W	160.00	95.00	60.00

16MM SOUND PROJECTORS

	New	Used	Trade-in
Ampro DeLuxe Stylist 1000 W case	$419.85	$265.00	$185.00
Ampro Cimet 40 1000 W case	579.00	397.00	256.00
B&H 285C 750 W Case	449.95	249.50	200.00
B&H 285 B1 1000 W Case	514.95	319.00	230.00
B&H 202C 1000 W Magnetic Case	699.00	444.00	375.00
Movie Mite 63L M 300 W Case	275.50	163.00	115.00
Revere SP16 750 W Case	325.00	163.00	135.00

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23D Federal 240 f7.9 storeway	24.95	14.50	10.00
23D Federal 269 f6.3 storeway	39.75	21.95	12.00
23C Federal 279 f6.3 storeway	46.95	25.75	17.00
23C Federal 311 f4.5 storeway	69.25	39.95	25.00
23CL Federal 315CL f4.5	80.00	49.50	30.00
45C AU Besseler 45M AutoFocus	197.75		90.00
57C AU Besseler 57MB AutoFocus	239.75		160.00
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45CL Federal 450CL f4.5	114.75	69.50	50.00
23D Fotoiarger Merit f6.9	23.95	14.50	10.00
23D Fotoiarger D45 f4.5	48.20	27.50	20.00
57D Solar 57D	86.50	49.00	35.00

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Brockway (M3)	16.95	11.95	8.00
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De Jur SB Spec	9.95	7.50	4.00
GE WD 68	24.50	11.50	8.00
USC No. 86	24.50	11.75	8.00
GE PRI	32.50	17.25	10.00
GE Mascot PR30	15.95	9.50	6.00
Gossen Underwater	69.50		30.00
Leica Meter	24.00	15.75	10.00
Minox Case & Chain	27.95	15.58	
Norwood Director	32.95	16.95	10.00
Polaroid	15.75	9.50	6.00
Sixti	24.95	15.50	10.00
Sixtomat X3	29.95	17.95	12.00
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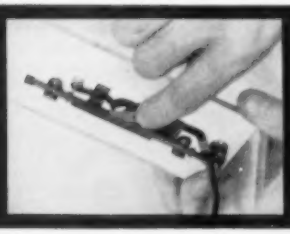

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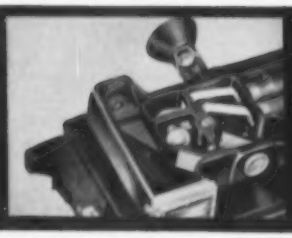

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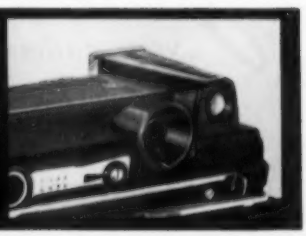

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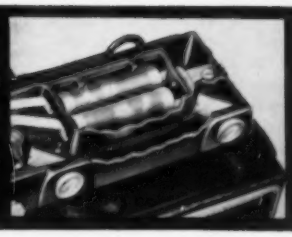

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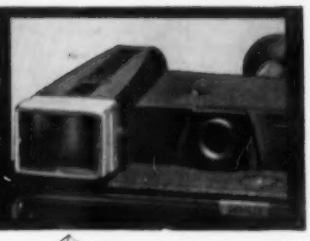

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35-mm today

By Bob Schwalberg

35-mm is enjoying its greatest boom today. Every month news of new products all over the world is dominated by new 35-mm cameras, equipment, and accessories. At least as many 35-mm cameras are manufactured today as the total of all other camera types, excluding the drugstore box. New cameras and lenses set mechanical and optical standards exceeding the highest previously considered possible. New super-fine-grain black-and-white films have drastically narrowed the gap between 35-mm image quality and that of larger negative formats. New ultra-fast black-and-white emulsions have greatly extended the miniature's facility in dim available-light situations. New fine-grain, high-energy developers are raising standards of negative quality. New color films with three times the speed of older emulsions are widening the 35's famous versatility in color.

Thirty years ago Oskar Barnack's little camera, the Model A Leica, was introduced to the world at the Leipzig Fair in Germany. Originally designed for making test exposures prior to shooting movie sets, this strange device made 36 exposures 24 mm high and 36 mm long on standard double-perforated motion-picture film. No other idea in photographic equipment design has ever aroused such a storm of controversy, ranging from absolute acceptance to complete condemnation, or exercised as profound and lasting an influence on photography and the world at large.

The popularity of the 35-mm miniature soared to dizzying heights in the 30's when it captured the mass imagination as the "candid camera" that caught people unawares with their guard down, often uncomplimentary, sometimes amusing, always interesting. The Leica and the legion of competitive 35-mm designs that sprang up around it quickly enlisted the enthusiasm of a new and serious breed of photojournalists who took 35's all over the globe from boudoirs to battlefields. These exciting little beauties with their sleek bodies, fast lenses, and three-dozen-exposure capacity gave birth to a new photography, a new way of seeing, a new camera journalism. With their help photographers learned to shoot quickly, unobtrusively, and to make groups of related pictures instead of the single shot. And while 35-mm mightily helped photojournalists, scientists, and other serious users of photography, it became the amateur's delight. No other camera did as much to popularize photography as a hobby for the millions as did the 35. Now the Sunday shooter could sally forth unencumbered with "the camera you can put in your pocket" . . . "a mere handful."

Then came the 1940's, and the 35-mm passion receded. There were many reasons. One was the competition from larger-format roll-film cameras whose users learned to adopt the developing technique worked out for and by the 35-mm fraternity. The construction of these cameras was greatly influenced by the 35 and they became smaller, lighter, and more compact. In addition, they borrowed such 35 features as the coupled film-wind and shutter-recocking mechanism with double-exposure prevention, the coupled rangefinder, and high-grade eye-level optical viewfinder. Another significant factor in this loss of 35-mm prestige was the rash of disastrously inferior miniatures which made their appearance in the late 30's and for the most part died unlamented deaths in the 40's. This had the effect of giving 35 a black eye among those whose camera budget was limited. This was, incidentally, the great era of double- and triple-extension flash and it did not seem that the small-camera format offered any real advantage in a mass of wires, stands, clamps, and reflectors.

Now the tide has turned and 35 is on top once more, and most of the still pictures made today are exposed on 35-mm, double-perforated movie film. Any attempt to account for this rebirth of interest in the miniature is doomed to less than complete success because of the difficulty of separating cause from effect. Is 35-mm more popular today because of superior 35-mm equipment, materials, and techniques, or vice versa? Is this rebirth of enthusiasm for the miniature due to the wide variety of new cameras and interchangeable lenses which is available today? Has it been the tremendous popularity of 35-mm color-slide making? Or has it to do with the 35's tremendous versatility and its unrivaled ability to capture what Cartier-Bresson has called "the decisive moment?"

The fact that today's 35-mm cameras, lenses, films, and developers are able largely to close the gap between 35-mm print quality and that of larger negative formats is, very probably, the foundation of the current 35-mm boom, which received its original impetus from 35-mm color. With today's equipment, materials, and techniques it has become almost ludicrously simple to achieve the kind of superb craftsmanship which required technical wizardry in a not-so-distant yesterday. But this is clearly not the whole story.

It is no mere accident or mass whim that most of the photographers who fill the pages of such national picture magazines as *Life, Look, Collier's*, etc., with exciting photographs and picture stories, use the 35 for most of their work. Today we have a whole new generation of young professionals and would-be professionals sailing into the magazine business with a couple of beat-up second-hand 35-mm cameras. There are exceptions, of course, and one can point to many newcomers who work with everything up to the 8x10 view camera. But the very large number of newcomers whose total photo-

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The solution to this problem is in the use of swings and tilts of the camera back. The camera is pointed up or down to include the subject. The back of the camera is then adjusted until it is vertical, or parallel to the subject being photographed. When observed through the ground glass, it will be seen that as the back is brought into this position, the lines of the image become parallel.

Another problem is one of keeping objects, at different distances from the camera, in focus — getting all the objects sharp. The usual method is to close down the diaphragm to a small aperture for increased depth-of-field or depth-of-sharpness. This, however, is only a compromise. Stopping down sacrifices lens speed — often when most required.

The ideal approach to such a problem is to use a camera with both lens and back movements. The principle is quite simple: Every lens-to-subject distance has its particular lens-to-film distance. By tilting or swinging the back in, one position will be found where both near and far objects are sharp, even at maximum aperture.

This problem often arises in portraiture. The subject is seated at an angle. The left shoulder is closer to the camera than the right. By swinging the left side of the back (photographer's point of view) so that its distance to the lens is increased, both shoulders will come into sharp focus.

The important advantage in using camera movements for focus control is that in this way each object is in critical focus. And any desired lens aperture may be employed. Tremendous depth-with-sharpness may be achieved by combining this technique with the practice of stopping down the lens. Dramatically overall-sharp pictures have been obtained of scenes with objects ranging from several inches from the camera to infinity.

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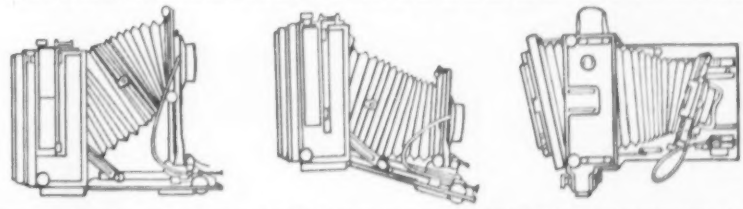

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graphic experience was acquired at the business end of a 35-mm camera, and the equally large number of established people who now shoot 35 exclusively or almost exclusively, provide ample proof that 35 has arrived. The miniature camera is no longer a novelty but an established photographic tool with advantages and liabilities. From contemporary sales figures it would seem that the advantages of compactness, ease of operation, and versatility far outweigh the liability implicit in its small negative format. In this connection it is amusing to note the skeptical reaction of the 35-mm crowd to the new batch of 16-mm and smaller sub--miniatures. How, they ask, can you expect to get decent image quality without a good-sized negative like 24x36-mm?

The future of 35-mm photography was ably though inadvertently summed up by a professional friend of ours who gazed dolefully at an advance model of one of the popular top-bracket miniatures and said sadly: "I guess we have to get used to perennial obsolescence. Every time I pay off a new camera or lens someone comes out with a better one." And the stream of new cameras and optics is not confined to the top price brackets alone. Many cameras costing less than $100 now have coupled rangefinders; some have f/2 lenses and a few offer lens interchangeability. Rapid single- and double-stroke lever winds seem to be the coming thing and we doubt whether any camera costing more than $75 will have a knob a year or two from now. Rangefinders and viewfinders are becoming bigger and brighter, making focusing and framing a downright pleasure. Inside the cameras all kinds of improvements are making their appearance. One very interesting new development is the glass or ceramic pressure plates which a few of the German cameras now feature and which are just about scratchproof. Synchronization for flash and speedlight is being extended and improved steadily. Two new cameras, the M-3 Leica and the S-2 Nikon, now synch electronic flash at 1/50 second.

Probably the next big break with tradition will be the fully motorized camera. In the past the only motorized 35 to stand the test of time has been the Robot, whose film gate is only 24x24-mm. The best-informed gossip holds that fully motorized 24x36-mm full-frame miniatures are just around the corner. Another new development in the offing will be the speeding up of wide-angle lenses. While 50- and even 85-mm f/1.5 lenses are not at all uncommon, the fastest 35-mm wide-angles are either f/2.5 or f/2.8. Already several manufacturers have managed to squeeze f/3.5 out of a 28-mm lens, and a 35-mm f/2 is on its way. Paralleling this interest in increased speed is a heavy emphasis on improved sharpness and resolution. It is recognized that many post-war f/2 lenses are better at full aperture than prewar lenses of the same focal lengths which were issued as f/4 and f/4.5 lenses.

New films and developers for optimum image quality on the one hand and increased emulsion speed on the other are constantly appearing. Since our Adox film article in May we have received samples of a number of new fine-grain,

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FLASH ATTACHMENT, was $19.75, now $14.75. Optical range-finder calculates correct exposure. Wired for auxiliary flash units. Complete with batteries.

LEATHER CAMERA CASE, was $12.50 ...now $9.75.

PERSONAL FILM CUTTER, was $19.50...now $14.75. Die cuts View-Master Personal stereo pairs to .001 inch accuracy. Illuminated. U.L. approved.

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SAVE ½ ON FAMOUS MAKE **REFLEX HOUSING for LEICA, CANON $29.95**

- Changes your Leica, Canon into single lens reflex camera. Ideal for parallax-free closeup, telephoto, medical and scientific work.
- Focus with fraction-of-inch accuracy through magnifier on bright, curved ground glass, press release: mirror jumps up, exposure is made of exact image you saw.
- Use Extension Tubes or Bellowscope for closeups, or with special 135mm lens for complete closeup to infinity range.
- Housing comes complete with this equipment: Foolproof lever double release device—elegant storage chest—rear and front caps.
- Lightweight (8 oz.) all metal construction allows handheld shooting even at slow speeds.
- 16 page inst. manual on reflex photography for your Leica, Canon.

SAVE MORE STILL BY BUYING THESE COMBINATIONS:

REFLEX HOUSING
- *3-pc. Metal Extension Tube Set $32.95
- *Special Ctd. 135mm f:3.8 Sun tele lens, in fac. mt. 64.95
- *Folding Bellowscope 39.95
- *Folding Bellowscope and special 135mm f:4.5 tele. 59.95

FREE with any combination above: Unique Dual Cable Release, for smooth off-the-camera releasing, a $6.95 value.

Shipping Charge $1.00

SYNCH YOUR OLD LEICA, CANON FOR FLASH OR STROBE $3.49 PPD.

No installation—just one quick adjustment over release button and you are all set for flash shots at speeds to 1/30th. Tripper accepts standard flashcord—or buy from us with flashgun to fit accessory clip.
Famous GEISS KONTAKT, synchronizes Leica IIIA, IIIC, cameras even at high speeds, was $19.95 **$8.95**
Imported Economy Gun w. tripper $6.49, w. Geiss **$9.75**
Fan-type BC Pocket Flash w. tripper $9.95, w. Geiss **$13.25**
Ship. Ch. 35c

1955 PRAKTIFLEX FX, EXA, LEICA-TYPE BODIES $59.95

All latest current 1955 models, with factory guarantees. For the many photographers who always wanted that 'second' body, to keep color film in one, b&w in the other, or have one ready with a telephoto, the other with a normal lens!
Praktiflex FX body also accepts Contax S, D, DA, Praktica lenses, Exa body accepts Kine Exakta lenses. Japanese Leica-type body has focal plane shutter, speeds from 1/20th to 1/500th, super imposed image type rangefinder, removable back for easier loading, M-X synch, couples to all Leica lenses.
Eveready Leather Case **$7.95** *Shipping Charge $1.00*
Attractive combinations available with normal, telephoto, wideangle lenses; also, for Leica-type, with reflex housing. Normal lenses from $9.95, telephoto lenses from $19.95 — write stating your needs.

SAVE 50% **BODY, REAR & LENSCAPS** SCREW-IN BAYONET

- For Leica, Canon, Kine Exakta, Praktica, Contax S, D, DA, Exa. **$1.00 ea.**
- All caps precision machined aluminum. **3 (asstd.) $2.60**

BODY CAPS protect camera body, shutter, when lens is removed. REAR LENS CAPS are a must for all your extra lenses. And FRONT LENS CAPS make perfect seal against any harm to optics, cannot fall off. Available for Sonnar, Biotar, Primoplan, Westar, Tessar, Triotar—be specific when ordering. *Prices on other Front Caps on request.*

4" f:4.5 CTD. LENS IN COMPUR RAPID

$14.95
- 9 speeds from 1 sec. to 1/400, B, cable release socket and built-in zero delay synch for flash and strobe. Diaphragm openings to f.22.

Ship. Cost 10c

Here is your chance to get a new coated, German-made (Spiratone-Hamburg) lens. Use it on any camera up to 3¼x4¼ (lens is actually designed 2¼x3¼ maximum corner to corner sharpness), for enlarging, adapt it for telephoto work with a 35mm camera, but hurry!

65mm WIDEANGLE for 2¼ x 3¼ $19.89

- 9 speed Compur Rapid shutter, to 1/500, with X synch for flash and strobe.

Another Leitmeyr made wideangle lens, 65mm f.6.8, covers about 85 degrees on the 2¼x3¼ negative. Its symmetrical construction permits use of either half of the lens as a 130mm telephoto. **Lensboard for Graphic (state model) $2.**
Shipping Chg. 25c
4" LEITMEYER WIDEANGLE LENS, FOR 4 x 5", IN COMPUR RAPID X-SYNCH SHUTTER $24.95

15MM F:1.9 BERTHIOT WIDEANGLE for 16MM $12.95

In Standard C Mount—Focusing 1 Ft. (30cm) to Inf.

Made by France's largest lens manufacturer, this fine color-corrected lens covers a 43 degree angle (normal lens covers 27 degrees), would normally sell for four or five times our price! Needless to say—the quantity is limited.
Shipping Charge 15c

COMBINATION 16MM OFFERS:

15mm F:1.9 Berthiot Wide-Angle + 3 mm
- Ctd. f:3.5 Unitel $29.95
- Foc. f:2.5 Kinotel $42.95
- Mt. f:1.9 Kinotel $49.95
- f:1.8 ultraspeed Unitel $54.95

C mount lenses fit virtually all 16mm Revere, Keystone, Bolex, B&H cameras.
Matching WA, 3" Tele Objectives for B&H — $4.95 each.

Fresh 35mm *Safety*

Film is a matter of confidence—you never know, if you get a 'bargain' until it is too late. Spiratone's prices are the lowest possible—for consistently reliable film. That's why not only thousands of amateurs, but scores of professionals, of hospitals and colleges, of scientists and government agencies—in short, critical users who can't gamble—rely on Spiratone. Play safe—use only Spiratone tested and recommended film.

FRESH SAFETY KODAK B&W FILM

All four popular speeds, Panatomic X (Background X), Plus X, Super XX and Tri-X are available in 27½ ft., 50 ft. and 100 ft. lengths and 20 and 36 exposure reloads.

27½ FT. **$1.39** 50 FT. **$2.29** 100 FT. **$3.98**

Shipping charges 10c, 30c, 50c

COMBINATION SPECIAL
Daylight loader with 5 cartridges and 100 ft. of black & white film, a $8.90 value **$7.99**
Shpg. Wt. 4 lbs.

BLACK & WHITE RELOADS
in metal cartridges may be assorted

20 EXP.	36 EXP.
40c ea.	**60c** ea.
6 for $2.00	4 for $2.00

Shpg. Chgs. 1 or 2 5c, 3 to 6 20c, 7 to 12 35c

ALL YEAR B&W ASSORT.
Daylight loader with 5 cartridges plus 27½ ft. each of Panatomic X, Plus X, Super XX and Tri-X **$10.49**

35MM COLOR BULK FILM

INCLUDING PROCESSING

Anscochrome, daylight, 18 ft., w. easy-loader	$14.95
Anscocolor, daylight, 27½ ft., w. 8 cartridges	11.95
Anscocolor, Tungsten, 27½ ft., w. 8 cartridges	9.50
Ektachrome, daylight, 27½ ft., w. 8 cartridges	15.95
Aero-Ektachrome, daylight, 27½ ft.	9.95

Shipping Charge 35c

for daylight loader with tongue cutter, add **$4.95** (Sh. Wt. 2 lbs.)

IMPORTED 35MM FILMS

for the discriminating black and white photographer
Your choice of these nationally advertised European films. Ilford HP3, ASA 125, Adox KB14, ASA 16, Adox KB17, ASA 32, Adox KB21, ASA 80.

20 exposure roll **65c**	3 or more (may be assorted) **55c** each
36 exposure roll **95c**	3 or more (may be assorted) **85c** each

35mm DAYLIGHT LOADER

INCLUDING 5 CARTRIDGES
$4.95 IF PURCHASED TOGETHER WITH MINIMUM OF $7.95 WORTH OF BULKFILM.

It's so simple to take advantage of the exceedingly low cost of 35mm bulkfilm and to load any desired length into a standard Eastman cartridge. First few reloads already make loader pay for itself. Loader alone with 5 cartridges, $5.95. *Sh. Wt. 4 lbs.*

DELUXE LOADER, with automatic counter, accepts also Leica, Contax cartridges — $10.95 or add $5.00 to comb. offers.

FREE FILM TONGUE CUTTER with your order for $5.00 or more of bulkfilm, or $4.25 worth of bulkfilm plus loader. For perfect shaping of tongue to assure smooth loading. Must be requested at time of purchase.

35MM KODACHROME 20 EXP ROLL **$1.49**

3 for $ 4.19
8 for $10.19
Fresh stock, in metal cartridges. Processing (pay later!) from 75c. *Shpg. Chgs. 5c, 10c, 25c.*

FRESH 35MM ANSCOCHROME EKTACHROME **RELOADS**

ASA 32—1956 dating—daylight type—20 exp.—in metal cartridge.
EACH ..... $1.50 3 for ..... $4.19 7 for ..... $8.50 *Shpg. Chgs. 5c per roll*

TRY THEM ALL — THE ECONOMICAL WAY!
NEW 35MM COLOR FILM TRIAL PACKAGE

20 EXP. ROLL, ASA 32 EKTACHROME
20 EXP. ROLL, ASA 40 AERO-EKTACHROME
20 EXP. ROLL, ASA 32 ANSCOCHROME
20 EXP. ROLL, ASA 128 ANSCOCHROME
$8.69 ea. INCL. PROC.
FREE With color trial package: 20 Exp. ASA 200 Tri-X Reload.

WE HAVE THE NEW SENSATIONAL
SEKONIC LEADER
PHOTO ELECTRIC EXPOSURE METER
$6.95 FOR IMMEDIATE DELIVERY. SEE AD ON PAGE 53a
case and metal chain, $1.50 extra

PORTABLE CRYSTAL-BEADED 30x40 TRIPOD SCREEN

LOWEST PRICES EVER **$7.69**

- Crystal-beaded Pyroxilyn surface.
- Screen raises and lowers on elevating rod, assuring positive alignment.
- Carrying handle sets automatically for balanced carrying.

Despite higher steel prices, Spiratone continues to offer you the biggest bargains in screens ever! Same quality as before, and as praised by thousands of movie and slidefans. Metal can has beautiful scratch-resistant finish. Sturdy tripod is plated and has protective rubber tips. Thousands of these screens are in use, not only by amateurs, but by clubs, churches, colleges as well.

Screen Size		Ap. Sh. Wt.
30" x40"	7.89	10 lbs.
40" x40"	9.18	11 lbs.
37" x50"	10.84*	14 lbs.
50" x50"	12.97*	15 lbs.
52" x70"	24.95*	

**Screens are shipped by us Express (freight costs collect) within U.S. — other screens P.P. or Express.*

for the twin lens reflex camera fan

SAVE 50% ON **PARALLAX-CORRECTING CLOSEUP SETS**

PLUS 1 (38"-20") Reg. $3.95 **$1.98**
PLUS 3 (13"-10") Reg. $4.95 **$2.49**

A 'must' for closeup work with Ciroflex, Graflex 22, Rolleis (3.5) etc. Sets fit your Ser. V filterholders—or we can supply. Slipon $1.00 ea., Bayonet $1.75 ea. *Shpg. Chgs. 10c.*

MAGNIFYING HOOD $2.95 PPD.
FOR ALL TWIN LENS REFLEX CAMERAS

Twin magnifier makes possible accurate focusing and composing of entire groundglass image with BOTH EYES and at comfortable distance, while protecting groundglass from glare. Saves eyestrain, helps accuracy, dim light focusing. Instantly removable and collapsible. For Rolleis, Graflex 22, Ricohflex.
COMBINATION OFFER: Magnifying Hood plus Fieldlens $4.50

FIELD LENS $2.00
A SENSATIONAL SPIRATONE EXCLUSIVE WORTH 2½ TIMES AS MUCH

A flat thin Fresnel ring plate which fits over groundglass in your reflex camera, greatly increasing brilliance of viewing image, making the often almost invisibly dark corner image ten times brighter! No installation—just drop fieldlens onto groundglass. **Postpaid.**
For Rolleiflex, Graflex "22", Ciroflex, Ricohflex, Agroflex, etc.

Spiratone AUX. TELEPHOTO and WIDEANGLE LENSES

FOR COLOR — FOR BLACK AND WHITE

By far the most popular accessory for the 35mm camera owner! Spiratone lenses add to the camera the advantages of telephoto effects for improved perspective in portraits, for moderate distance shots so that the important subject matter will fill the entire negative or slide, and of wideangle effects for landscapes, and indoors where space is limited, of greater depth of field.

SPIRATONE LENSES OFFER THESE EXTRAS:
- Built in or Separate Filterholder furnished for each (set of) lens(es)
- Interchangeability of standard adapters, so that one lens may often be used with several cameras (each lens is supplied with only one adapter—extra adapters are $1.25 each, when suited).
- Extra hard S-coating.
- Excellent color-correction.
- Lifetime Service Guarantee.
- No change in exposure or lens opening needed.
- Comprehensive instructions for simple use—lenses fit your camera like filterholders, require no installation.
- Availability of filters — your free choice of any TWO with every aux. lens you buy, selected from these: yellow, orange, green, haze, red, blue. Others $1.00 each.
- Availability of MATCHED telephoto and wideangle finders, and a special Universal Finder.
- Telephoto and Wideangle Finders fit accessory clip, can also be used handheld.

UNIVERSAL FINDER is matched to your wideangle, normal and telephoto lenses. Ideal for every camera — even without auxiliary lenses, because it provides for much needed parallax correction from three feet to infinity. Available in two models: 50mm for Retina, Argus, Pony, etc., 44mm for Bolsey, Contessa, Signet.

Each lens in leather case (incl. 2 filters) *Shpg. Chg. 25c* **$16.95**
Set of both lenses, in double leather case (including 4 filters) *Shipping Charge 50c* **$29.95**
Each Finder, telephoto or wide angle both for $7.49 **$3.95**
Universal Finder **$8.59**
Accessory Clip for Argus C3, easily installed $1.00
Accessory clip, easily glued to most cameras 75c

GREAT NEWS
Spiratone aux. telephoto and wideangle lenses, greatly improved, are now available at the same low prices for 2¼ x 2¼ Twinlens Reflex Cameras—Rolleicord and Rolleiflex bayonet mount (f.3.5 only), Ciroflex, Graflex 22, Ricohflex, Kodak Reflex. For twinlens users seeking a moderate increase or decrease in focus length, Spiratone aux. lenses add greatly to the versatility of their camera.

SPIRATONE AUXILIARY LENSES ARE AVAILABLE FOR THESE 35MM CAMERAS AND MANY OTHERS
ARGUS C3, C4 — EDIXA
BANTAM — KODAK 35
BOLSEY — MERCURY
CONTAFLEX — RETINA
CONTESSA — SIGNET
EDIMEX — VITO

GERMAN ALL-METAL **RANGEFINDER $2.95**

Employs super-imposed image system for rapid, accurate focusing from 2 feet to infinity! All-metal construction, leather covering, modern styling. Specify feet or meters. Case 49c. *Shpg. Chg. 10c*

NEW FALL 1955 CATALOGUE. Order yours today. Only 5c per copy—25c back on first purchase! Contains a wealth of interesting accessories at fabulously low prices!

All prices include excise tax. Postage and insurance MUST be prepaid, even when no shipping weight is stated — overpayment will be credited in full. Everything listed is brand-new (unless otherwise stated) and fully guaranteed against defects. 25% deposit on C.O.D.'s. Items marked 'Free', 'Premium' or 'Bonus' MUST be requested at time of purchase. Foreign orders welcome — slight extra handling charges apply.

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How much

Folks are calling from all over the country to ask this question. Whether you want to buy or trade, you will get more for your money at Olden.

35MM CAMERAS	LIST	USED
Argus C3, case & flash	66.50	31.95
Argus C4, F:2.8	84.50	43.75
Canon, Serenar f:1.8, Rfdr.	295.00	136.95
Contessa 35 Tess. 2.8, Rfdr.	142.00	84.95
Contax II Sonnar F.2	.....	82.95
Contax IIA, Sonnar F.2	336.00	148.50
Contax IIIA, Sonnar F1.5	412.00	194.50
Ditto 99, F:2.8, MX	48.00	.....
Kodak Pony F:4.5 synch.	29.75	17.95
Kodak Signet, Ektar 3.5, Rfdr.	75.00	42.95
Leica IIIC, Summitar F:2	.....	98.00
Leica IIIC, Summarit F1.5	.....	148.00
Leica IIIF Elmar F:3.5	237.00	132.50
Leica IIIF Summicron F:2	336.00	177.75
Leica IIIF Summarit F:1.5	357.00	186.95
Leica M-3, camera only	288.00	.....
Mercury II, F:2.7 ctd.	41.50	18.95
Retina IIA, F:2 ctd. autom.	127.50	71.25
Retina IIIC F:2 synch.	185.00	117.50
Revere Stereo F:3.5 synch.	174.50	75.50
Robot 'Star' Xenon F:1.9 ctd.	127.50	79.50
Robot 'Royal' Xenon F:1.9 Rfdr.	295.00	136.50
Stereo Realist F:3.5 Rfdr.	159.00	66.25
Voigtlander Vitessa F:3.5 Rfdr.	99.50	62.95
Voigtlander Vitessa 'L' F:2	159.00	97.00
Voigtlander Prominent F:1.5	270.00	136.50
Zeiss Super D, Biotar F:2	.....	96.50
ELECTRONIC FLASH		
Mighty Lite, AC-unit	54.50	36.00
Mighty Lite, batteries	69.50	43.50
Circular Close-up attach.	39.50	23.75
FR. dry-cell batteries	54.50	33.95
Dormitzer, DBI, batteries	115.95	67.50
Heiland V. batteries	119.50	57.00
Heiland VII, latest, AC	69.50	.....
Ultrablitz IIM	69.95	39.50

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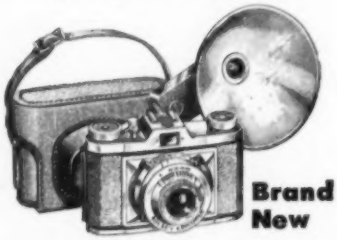
NORWOOD DIR. reg. 32.95	23.95
NORWOOD M3, reg. 16.95	12.75
SIXTOMAT X-3, reg. 29.95	19.75
WESTON MASTER II, reg. 29.95	22.40

MOVIE CAMERAS & PROJECTORS		
B&H 220, 10mm F:2.5	49.95	27.25
B & H Companion F:2.5	79.95	39.50
B & H Auto-8, 172-8, F2.5	134.95	74.00
B&H Tri-lens, F:2.5	129.95	67.50
Cine Kodak Mag. 8: F:1.9	149.50	56.95
Kodak Brownie F:2.7	37.50	21.95
Revere 50, F:2.8	49.50	24.00
Revere 80, F:2.5	97.00	43.95
Revere 84, Turret, F2.8	122.50	46.00
B & H Mag. 200, F2.5	174.95	97.25
B & H Filmo 70-DL, F1.9	364.95	218.00
Cine Kodak Mag. 16, F:1.9	.....	58.00
Cine Special F:1.9, Acc.	.....	258.00
Super Pathe 16, F:1.9	810.00	218.00
B&H 253, 500W, case	79.95	47.50
B&H 'Regent' 500W, case	179.95	102.75
Keystone K70, 500W, case	74.50	44.25
Keystone K95, 750W, case	119.50	69.50
Kodak Brownie, case	62.00	37.50
Revere 85, 500W, case	124.50	89.25
Keystone A-82C. 750W. case	129.50	89.50
Keystone K-161-V, splicer, case	159.50	84.75
Revere Sound projector	325.00	163.00
B & H Filmosound 285-C	449.95	249.50
B & H 202, Magnetic Sound	719.00	444.00

New "Explorer" 35MM Camera

Including case & flash



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ONLY $47.95 COMPLETE OUTFIT

• BOLSEY 35mm Explorer Camera

High speed f2.8 45mm lens—rapid wind lever which transports film, counts exposures remaining and cocks the shutter with one single motion—all metal construction, die-cast aluminum body—convenient body shutter release—no double exposures—depth of field ring which shows distances at which subjects are in perfect focus—beautiful design with rich grey leatherette—genuine leather E. R. case—all metal modern design flashgun.

BOLSEY B, CASE & FLASH SPECIAL, BRAND NEW . . . $34.95

BOLSEY JUBILEE

35mm Rangefinder Camera

- SET-O-MATIC SHUTTER
- F:2.8 COATED LENS
- MODERN DESIGN FLASHGUN
- TOPGRAIN CARRY CASE

BRAND NEW $79.50

No calculations . . . One simple setting of Set-O-Matic automatic diaphragm computer for entire roll—then range-find and shoot—*that's all!* Gorgeous color slides, crisp black and whites . . . An exclusive picture-taking ensemble with the world's first and only camera that gives you perfect flash pictures AUTOMATICALLY!

PHONE NEW YORK MURRAY HILL 4-4285

PRAKTICA FX

F:1.9 ctd. pre-set
Reg. $159.00.
BRAND NEW $76.50

FREE! German Flashgun

VOIGTLANDER VITO II

- Color-Skopar F:3.5 ctd.
- Prontor 'X' Synchro Shutter
- Built-in Selftimer

Reg. $54.50 ..... $28.50 BRAND NEW

BRAND NEW

RICOHFLEX

- 2¼ x 2¼ Reflex
- F:3.5 ctd. lens
- synchro shutter

BRAND NEW $24.85

Ricohkin 35mm attachm. $12.75

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TESSAR F2.8, SYN.

Automatic Diaphragm

USED $86.25

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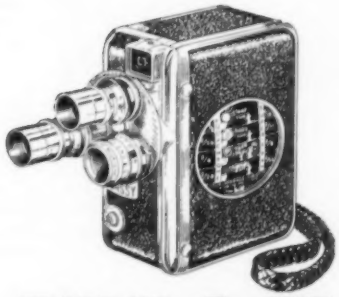
- Synchro shutter 1-1/300
- Direct Sportsfinder
- Built-in selftimer

Reg. $99.50
Save $51.50 **$48.**
BRAND NEW



TRADE UP TO A NEW DeJUR 8mm MOVIE CAMERA

CITATION	with f/2.5 F.F. lens	77.50
	with f/1.9 F.M. lens	102.50
EMBASSY	with f/2.5 F.F. lens	106.95
	with f/1.9 F.M. lens	131.95
EMBASSY TURRET	with f/2.5 F.F. lens	131.95
	with f/1.9 F.M. lens	156.95
FADEMATIC	with f/2.5 F.F. lens	127.50
	with f/1.9 F.M. lens	149.50
FADEMATIC TURRET	with f/2.5 F.F. lens	147.50
	with f/1.9 F.M. lens	169.50

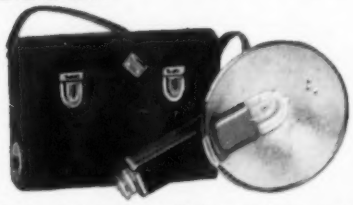
8mm MOVIE PROJECTOR

Model "500" with carrying case	69.50
Model "750" with carrying case	159.50
Model "1000" with carrying case	177.50

EXPOSURE METER

Dual-Professional	26.95
Model "5B" with Eveready case	15.95

DeJUR Electronic Flash



Guide number for color is 50. Compact design, easy to carry. Weighs 4 lbs. with batteries. Can be used with any x-synchronized shutter. Produces 5800 °K flash for use with daylight color film. One set of 90-Volt dry "B" batteries produces 2500-3000 flashes. Federal tax included. **$39.50**

HIGHEST TRADE-IN ALLOWANCE

8 to 12 hours Delivery ALL OVER U. S. A.

REFLEX & ROLLFILM	LIST	USED
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Exakta 66, Tess. F:2.8, Latest	319.50	179.50
Hasselblad 1000F, F:2.8	379.50	199.50
Rolleiflex Auto Xenar F:3.5	.....	77.95
Rolleiflex Auto Tessar F:3.5	.....	87.95
Rolleiflex Auto Xen. 3.5 'XM'	219.50	116.95
Rolleiflex Auto Tess 3.5 'XM'	239.50	126.95
Rolleiflex Auto Xen. 2.8 'XM'	309.50	176.00
Rolleicord V MX Xenar 3.5	134.55	88.50
3¼x4¼ Super D Graflex	289.50	99.00
Kodak Medalist, Ektar 3.5 Rfdr	.....	53.95
Kodak Medalist, II, Ektar 3.5	.....	106.00
Minox III, F:3.5 ctd	119.00	78.95
Polaroid 95, 3¼ x 4¼	89.75	39.50
Super Ikonta A, Tess 3.5	99.00	43.00
Super Ikonta B, Tess 2.8	139.00	64.75
Super Ikonta BX, Tess 2.8	163.00	89.00
Super Ikonta C, Tess 3.5	114.00	58.95

BINOCULARS

6x30 center focus	17.35
7x35 center focus	22.50
8x30 center focus	21.50
7x50 night glass	24.50

all coated, liteweight, shockproof. Add 10% Fed. Exc. Tax

LEICA, CONTAX, EXAKTA LENSES		
21mm Biogon F:4.5 W.A. 90°	249.00	176.50
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high-resolution films which will shortly be marketed. Several new black-and-white 35-mm films in the ultra-fine-grain and high-speed varieties will also be introduced to the American market in the near future.

No longer a novelty or a fad, 35-mm has dug in to stay as one of the respected and relied-upon photographic tools. Less than a year ago the sales manager of one of the leading 35-mm camera importers with an enviable line of cameras and lenses complained to us that the 35 was largely being considered solely as a color camera by the bulk of American amateurs, who used larger cameras for black-and-white. This trend also seems to be reversing itself, if the resurgence of interest in new black-and-white films and developers from Adox to Tri-X and Neodyn to Microphen is any indication. 35-mm photographers no longer spend half their waking hours bragging about how their print quality matches that of larger negative formats and how the 35 is the only camera, a sort of wave of the future which can do anything better than anything else. Recognizing that with anything like an even break the difference between quality from the 35 and from roll-film cameras is only piddling, and that the bigger cameras do possess virtues of their own, they are concentrating on making pictures. And very good pictures they are!—

FROM BLUE JEANS TO BANGLES

For readers who prefer exotic to homespun glamour we present this alternate view of Joan Collins (see cover) as she appears in Warner's new film, *Land of the Pharaohs*.

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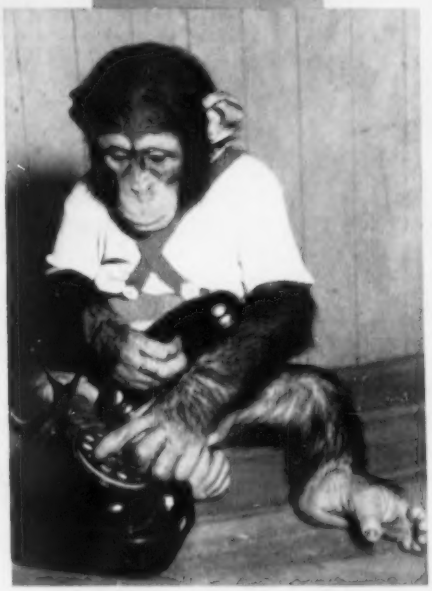

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Notes on "Family of Man"

The public's interest in great photographs was powerfully demonstrated by attendance figures for Edward Steichen's great show, *The Family of Man*, which hung in New York's Museum of Modern Art from January to May. Two hundred seventy thousand people saw the 503 photographs—a greater number than has visited any Museum exhibition in the past 15 years. Steichen's theme was the universality of the family of mankind, and he clearly struck a responsive chord in his audience. The impressive show is now repeating its triumph at the Minneapolis Museum of Art; from there it moves to Dallas, then to Cleveland, Philadelphia, and Baltimore, and next year it will be presented in Europe and Asia by the U. S. Information Agency.

Watch for the *Annual*

As you read this, the presses are about to roll on the 1956 edition of PHOTOGRAPHY ANNUAL. We're glad to report that the pictures in it are better than ever; they were selected from a much greater number of contributions than we had received in any previous year. This increased interest on the part of professionals and serious amateurs all over the world reflects the growing prestige and importance of the ANNUAL in its field. More than ever this year, it is the world's biggest dollar's worth of fine photographs. You'll be able to buy your copy late in August. Don't miss it.

One-Subject Issue

As you know by this time, this issue is entirely devoted to a single subject: 35-mm photography. Putting it together has been an interesting and educational experience for every staff member who worked on it—as it will certainly be for everyone who reads it. The job could not have been done so comprehensively and so well without the constant collaboration of Contributing Editor Bob Schwalberg, whose name is already familiar to you as author of many of our technical stories. Bob's camera arsenal includes equipment of just about every size and type, but he's pretty much of a "35-mm man," and his experience has been reflected in one way or another on nearly every page of this issue. His "big story" is on processing, probably the most vital and least understood aspect of miniature camera work.

Photo by M/Sgt. Charlie Fetterman

Schwalberg: "35-mm everywhere."

The Pulitzer Winner

Bruce Downes' provocative editorial in the May issue *(How Important Is the Pulitzer Prize?)* stirred up quite a controversy, as might have been expected, both among our readers (see *Letters to the Editor*) and in the field of photojournalism. It's quite apparent, though, that it did not influence the judges in their choice this year. John Gaunt's prize picture drew this comment from Downes: "It is no exception to the trend of recent years. Once more it glorifies the lucky scoop, puts a premium on mere sensation, when it should emphasize creative photojournalism. This year's picture is dull; it would be meaningless without an explanatory caption."

"Grief"—John Gaunt's 1955 Pulitzer Prize photograph.

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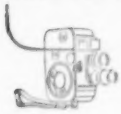

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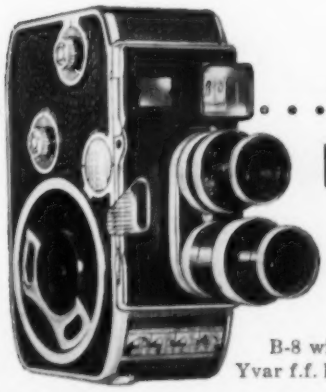

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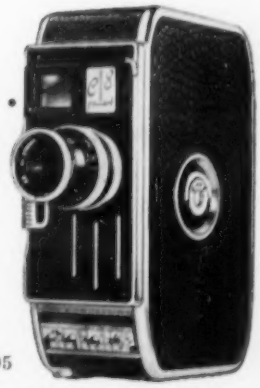

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35-mm

A Popular Photography special issue

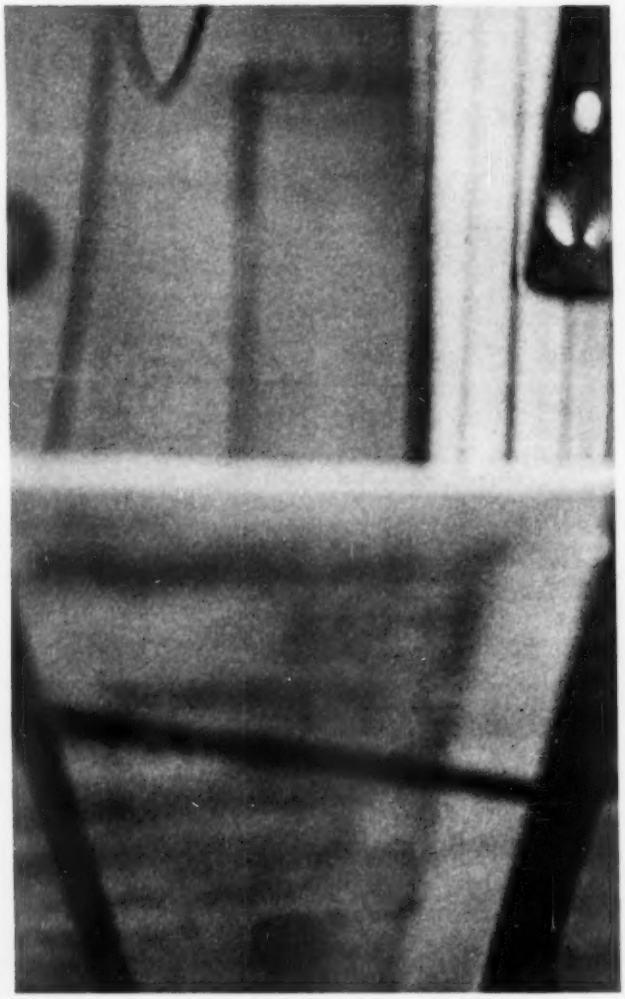
FOR MILLIONS of photographers, 35-mm means more than just a film or camera size: it symbolizes an approach to pictures, a philosophy of photography . . . even a way of life. Perhaps no invention since George Eastman produced the roll-film camera has so revolutionized the art of seeing and taking pictures or acquired prestige and popularity so rapidly. Only 30 years ago, when the first 35-mm camera was introduced at the Leipzig Fair, it was regarded by many as a mere plaything. Today the myriad descendants of Oskar Barnack's prototype Leica are enormously popular among Sunday snapshooters, advanced amateurs, and professional photojournalists alike. In fact, the current PHOTOGRAPHY DIRECTORY lists more than 100 kinds of 35-mm cameras, while more than 64 percent of our readers own and use at least one such camera. The reasons for this enthusiasm are not hard to find: mobility, economy, fast lenses, great depths of field, and large film loadings, to name the most important. Not only is it *the* camera for color and candid, available-light shooting but it also can produce enlargements of very high technical quality. Never before has it been easier, more exciting, or more fun to shoot 35-mm, and within this issue you'll find practical, up-to-date information to help you on your way. But also important are the four picture spreads on children, available light, landscapes, and still lifes, which indicate a few of the many ways in which these versatile cameras may be used. In the last analysis, it is through the kind of pictures it makes possible that 35-mm photography has shown its worth in the past and offers its promise for the future.

Photograph by Ed Feingersh for *Argosy*

35-mm

Why is it so popular?

By George Cserna



1

Optical Advantages

The short focal length of a normal lens for a 35-mm camera provides great depth of field even at relatively wide apertures, thus making focusing less critical and permitting interesting effects of near-to-far sharpness. In the group of parade watchers, above, camera was focused about one third of the way back and stopped down to *f*/8. Everything is sharp except closest foreground figures. Relatively small size of lenses for 35-mm cameras also makes it possible to produce lenses of extremely high speed—*f*/2 and *f*/1.4 being commonplace today. No other camera type is available with such fast lenses. Advanced models are available with interchangeable lenses of various focal length.

2

35-mm pictures: children

By M. J. Dain for Heritage Records

By Peter Basch

Mobility

Because the pocket-size 35-mm camera is so light, compact, and easy to handle it often can go places and get pictures that would be difficult or even impossible to achieve with a larger camera. This great mobility, coupled with fast lenses that permit its use in available light, makes the 35-mm an ideal camera for candid shooting. Typical is this animated shot of librettist Adolph Green. The great mobility of the 35-mm camera makes possible its own brand of photography—lively, unposed, realistic. It also gives the photographer great physical freedom to shoot his subject from many positions and to explore the effect of various camera viewpoints, angles, and distances.

3

Large Film Loads

A third big advantage is 20 or 36 exposures per loading. Most 35-mm cameras can be operated swiftly, and the resulting contact strip can look almost like a motion picture film. In the contact prints reproduced at top notice how the photographer caught a variety of slight, subtle changes in the subject's pose, expression, and position. Of course, this ease of rapid shooting and the relatively low cost of 35-mm film can lead to abuse if the photographer becomes careless and shoots indiscriminately. But in skilled hands it's a great aid in catching the exact instant.

35-mm pictures: children

David Vestal. Pentacon, 58-mm Biotar f/2; 1/50, f/5.6, Super-XX

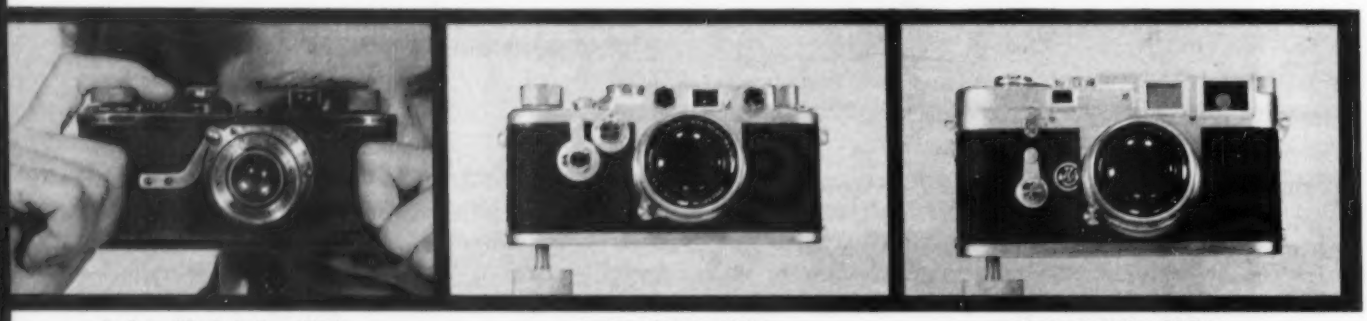
CHILDREN'S expressions are fleeting, candid, fragile. Capturing them requires a special kind of camera technique, for which the 35-mm is an ideal instrument. It helps in "stalking" young subjects; many experts feel the eye-level operation makes the camera more nearly a "part of the eye," and speeds the reflex action of trigger squeezing. At any rate, a smaller camera is less obvious, often less inhibiting to a child. And the possibility of using very wide apertures is an asset when you may need to follow a child from bright sun through shadows and into deep shade before you get your picture. (Note, however, that none of these three photographers had to shoot "wide open.") The secret of successful 35-mm photography of children: train yourself to watch for expression and gesture, without forgetting to hold the camera steady and stay in sharp focus!—▶

Ruth Orkin. Contax, 50-mm Sonnar f/2; 1/125, f/3.5, Super-XX

← **Yella Niclas.** Exakta, 58-mm Biotar f/2; 1/100, f/8, Super-XX

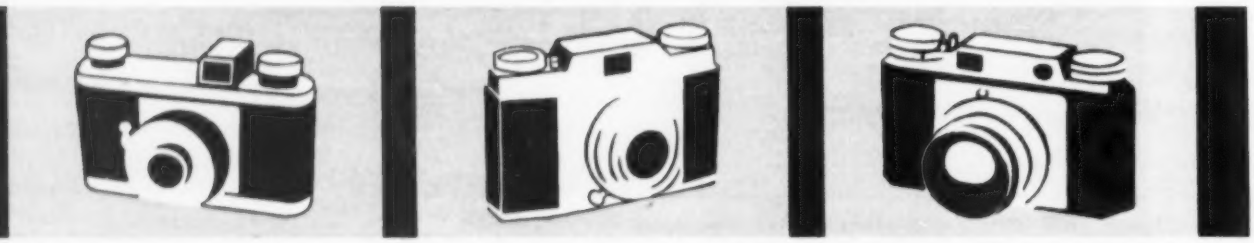
35-mm Facts about

These are several top 35-mm cameras that evolved from the first



Leica Model A, 1924 | Leica IIIF, 1950 | Leica M-3, 1954

Here are the six basic classifications into which more than 100



Fixed-focus box camera with eye-level viewfinder, one or few lens and shutter settings.

Noncoupled-rangefinder type with manual focusing and adjustable shutter and lens.

Coupled-rangefinder type with eye-level viewing, and full shutter and lens settings.

SOME forty-odd years ago an optical engineer named Oskar Barnack, in the process of designing a motion-picture camera, decided to build a very small still camera with which he could make test exposures on 35-mm movie film. Barnack's prototype so intrigued Ernst Leitz, Sr., that after ten years of experimentation and modification the first Leica was introduced to the world at the 1925 Leipzig Fair.

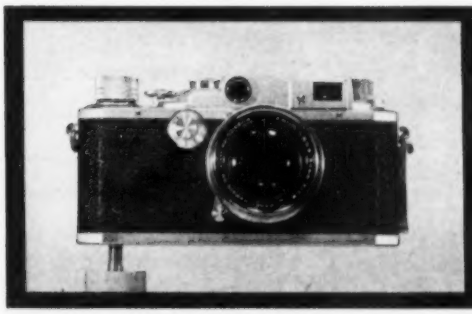
This granddaddy of all 35-mm cameras made thirty-six 24x36-mm negatives on one loading of 35-mm double-perforated movie film. One revolution of the winding knob reset the focal-plane shutter and advanced the next frame of film. Picture framing was accomplished by means of an eye-level optical viewfinder mounted on top of the narrow camera body. The lens was a 50-mm $f/3.5$ Leitz anastigmat, and it was focused by means of a distance scale engraved around the base of the helical lens mount.

Today, thirty years after the unveiling of Barnack's brain child, the 35-mm department of any fair-sized camera store contains a confusing array of glittering chromium-clad "minature cam-

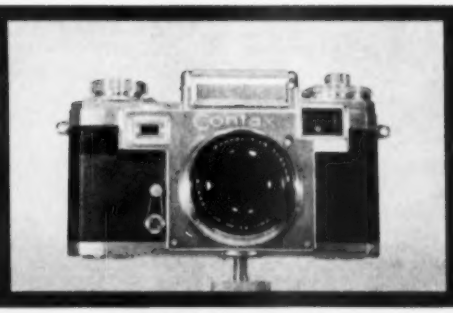
← Yolla Niclas. Exakta, 58-mm Biotar f/2; 1/100, f/8, Super-XX

the cameras

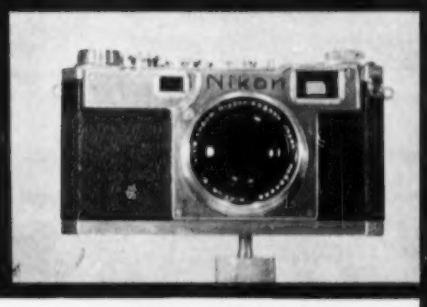
miniature designed by Oskar Barnack of Germany



Canon IVs, 1950

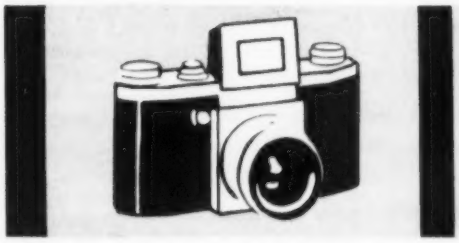


Contax IIIa, 1951

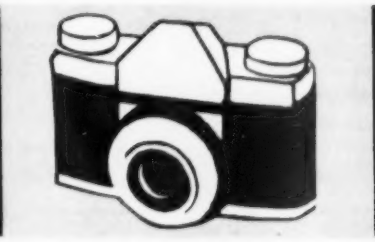


Nikon S-2, 1955

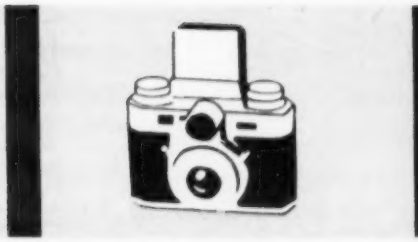
different makes of modern 35-mm cameras fall



Single-lens reflex type with groundglass for waist-level viewing and for focusing.



Single-lens reflex with eye-level groundglass focusing through a prism or mirror.



Twin-lens reflex camera with focusing and framing through a separate viewing lens.

eras." Almost 200 different makes and models are manufactured today in Germany, Japan, Switzerland, Italy, France, Great Britain, and the United States. By our count 97 different models are currently merchandised by American importers, manufacturers, and subsidiaries of foreign producers.

Almost all of these little cameras follow the 24x36-mm format accidentally hit upon by Barnack, who, being a conservative by nature, simply doubled the 24x18-mm movie frame in order to get a negative big enough for a man to look at with his naked eye. Notable exceptions are the Robot motorized 35-mm cameras which make square 24x24-mm negatives and the Kodak Bantams (and a few others) which make 28x40-mm negatives on 35-mm *unperforated* No. 828 rollfilm.

Miniature cameras can be classified according to picture-framing and range-finding. They fall into six categories: (1) The fixed-focus box camera with eye-level viewfinder. (2) Simple cameras with eye-level viewfinders and distance focusing scale, or those with eye-level finders and built-in noncoupled range-finders. (3) (*Continued on page* 106)

35-mm Facts about

GROUP 1: Obtains maximum resolution, minimum graininess in well-lighted outdoor situations.

GROUP 2: All-purpose films that can handle easily almost any subject or lighting condition.

GROUP 3: High-speed films, moderately grainy, that are ideal for difficult available-light situations.

GROUP 4: Special-purpose films. Below, bizarre effect achieved by high-contrast copying film.

the films

Group 1: Slow-speed, ultra-fine-grain panchromatic black-and-white films for minimum graininess and maximum resolution.

(Photograph by Bob Schwalberg)

Film	Manufacturer's ASA Speed Ratings		Remarks
	Daylight	Tungsten	
Adox KB-14	16	12	These ultra-fine-grain films possess significantly less exposure and development latitude and should therefore be treated with care. Development in formulas containing silver solvents is self defeating and will undermine the wonderful resolution otherwise possible. See discussion of exposure and development on page 88.
Adox KB-17	32	25	
Gevapan 27 Microgran	32	20	
Ilford Pan-F	16	10	

Group 2: Medium-speed, medium-fine-grain panchromatic black-and-white films for general photographic applications.

(Photograph by George Caerna)

Film	Manufacturer's ASA Speed Ratings		Remarks
	Daylight	Tungsten	
Adox KB-21	80	64	These are the 35-mm man's basic all-around performers with a maximum of versatility. With correct treatment in exposure and development they can compete with films in Groups 1 and 3. Plus-X is notable in that with development in Promicrol or Microphen it outperforms half of the Group 3 speed films by working at an effective index of ASA 320, three stops faster than its tungsten rating. The other Group 2 films are not quite as fast as Plus-X in available-light applications.
Ansco Supreme	50	32	
Du Pont Superior No. 2*	50	32	
Gevapan 30	64	40	
Ilford FP-3	64	50	
Kodak Plus-X	50	40	

**Available only in 100 ft. and larger bulk loads from Du Pont.*

Group 3: High-speed, moderately grainy panchromatic black-and-white films for use where high emulsion speed or low contrast are desirable.

(Photograph by Bob Schwalberg)

Film	Manufacturer's ASA Speed Ratings		Remarks
	Daylight	Tungsten	
Ansco Ultra Speed Pan	100	64	Note that in available-light practice these films are either no faster or actually somewhat slower than Plus-X. Their resistance to blocking-up makes them ideal for flash or other very high-contrast applications.
Gevapan 33	125	80	
Kodak Super-XX	100	80	
Gevapan Press	200	160	These are the high-speed champs and can be used with great success at speeds on the order of 800 ASA in the dimmest lighting conditions. Because they are somewhat grainy they should never be employed where a Group 2 film will do the job.
Ilford HP-3*	200	160	
Kodak Tri-X	200	160	

** Not to be confused with the earlier version of HP-3 which was rated at 125 for daylight, 100 for tungsten light. New HP-3 is distinguished by the daylight index "200" which is printed on the side of the film carton.*

Group 4: Special films for specifically limited photographic applications.

(Photograph by Norman Rothschild)

Film	Description of Use
Kodak Infrared	High-contrast infrared film with high blue sensitivity. Used with orange and red filters (to cut blue) produces unusual landscape effects free of atmospheric haze. Tungsten speed index of 20 for ASA calibrated meters is given for use in conjunction with No. 25 Wratten filter.
Kodak High Speed Infrared	Very fast infrared film designed for scientific purposes as well as for use with infrared flash. No exposure indexes published by manufacturer. Potentialities for available-light photography were explored in the article *Super-Speed Infrared Film*, PHOTOGRAPHY, August 1954.
Kodak Direct Positive	Panchromatic reversal film for producing positive black-and-white transparencies for projection. Speed indexes: 64 daylight, 50 tungsten, for use with meters calibrated in the ASA system.
Kodak Micro-File	Very fine-grain panchromatic film for copying. Tungsten index of 16 for *incident* light meters calibrated in the ASA system. *For reflected* light meters take reading off matte white card and use index of 3.
Kodak Fine Grain Positive	Fine-grain positive black-and-white film for producing positive transparencies (by contact) from black-and-white negatives. Consult Kodak data book on copying.

A GREATER VARIETY of *better* 35-mm black-and-white films is available today than ever before. But this abundance of fine films can be a mixed blessing. Too many photographers switch from brand to brand and from type to type with such frequency that they never really learn how best to work with any one film.

With the exception of the special films in Group 4, these films have five major characteristics. These are: speed, graininess, contrast, resolution, and latitude. No one film possesses an ideal combination of virtues. The faster films tend to be more grainy, less contrasty, less able to resolve fine detail, and have good latitude toward errors in exposure and development. The very slow films tend to be very fine-grain, contrastier, better able to resolve fine detail, and less able to withstand errors in exposure and development. The choice of a film is therefore a personal compromise which each photographer must work out in terms of the types of pictures he makes and the kind of prints he makes. Obviously, if one is mainly involved in outdoor shooting under favorable lighting conditions, fine grain and resolution become more important than emulsion speed. The available-light photographer, on the other hand, will gladly accept some loss of fine grain and resolution in exchange for increased speeds.

This chart represents an attempt to group 35-mm black-and-white films according to their most important attributes and the jobs that they perform best. Most photographers would do well to standardize in the beginning upon one of the all-purpose films in Group 2. Once the photographer has learned to exploit fully one film's advantages and has become aware of its inherent limitations he can consider either switching to another film or relying on one or more additional films to fill in where the standard film falls short.

Most 35-mm films are available in both 20- and 36-exposure cartridges and in bulk loadings. Purchasing film in bulk (usually lengths of 27½, 50 or 100 feet) and loading one's own can cut the cost per cartridge down to as little as 20-25% of the price of regular factory-loaded film. (See story on bulk film on page 68 of this issue.)

35-mm pictures: available light

FOR PHOTOGRAPHY under poor light conditions, nothing can match the 35-mm camera. Its lenses are faster, focusing is generally easier, it is more maneuverable in the candid situations that account for most available-light pictures, and its big film load makes possible three times as many shots between reloads. Here are two examples, one made in Times Square on New Year's Eve, the other in a costume-shop dressing room. Note that both photographers used almost identical exposures; neither exploited his camera's maximum aperture or slowest feasible shutter speed.

Garry Winogrand. Leica, 50-mm Summar f/2; 1/30, f/2.5, Plus-X

Courtesy *Life*, © Time, Inc.

→

Leonard McCombe. Contax, 50-mm Sonnar f/2; 1/25, f/2.8, Super-XX

By OTTO BAYER

35-mm you can save money

CHANCES are that if you've been using a 35-mm camera for some time, you're already aware that one of the advantages of miniature photography is its economy of operation. When you buy 35-mm film, you get a lot of potential pictures in a convenient, small package for very little money.

But you can reduce your film costs to an almost insignificant level if you utilize one of the most convenient aspects of small-film packaging—bulk rolls of film sold in 27½-, 50-, or 100-ft lengths to make five, nine, or 18 loads of 36 exposures, at a cost of about a penny per exposure, rather than about 3 cents if bought in cartridges. At this rate it doesn't take much shooting to add up to considerable saving.

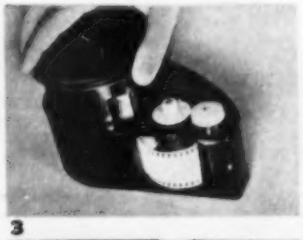
Economy, however, is not the only attraction to rolling your own. Some special-purpose films just aren't available in cartridge form, but do come in various bulk lengths. The chart on the following pages shows you exactly what films you can buy in bulk form. You may run onto others we didn't list—but if you do, be sure you're buying film intended for use in still cameras. Movie film is not usually advisable for still shooting—for one thing, it may have no anti-abrasion overcoating, and is meant to be processed by the reversal method in special developers.

Another aspect of bulk-loading ease is that you have the option of loading a cartridge or cassette with any number of exposures you like; sometimes it's good to have lengths of 10 or 15 exposures available for a short series of pictures, so you can process them right away without the necessity of finishing an entire roll of 20 or 36 exposures. If you want to load an odd number of exposures of color film, you'd better check first with your

Here are four basic loading methods

1

2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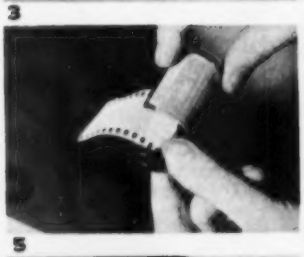
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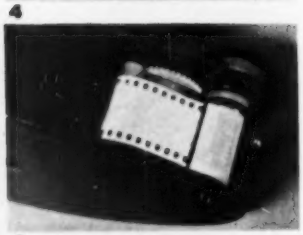
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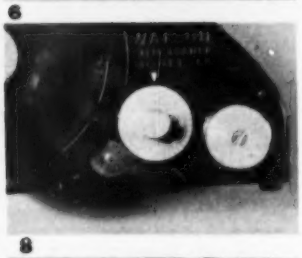
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9

10

Watson daylight loader

1 Loader disassembled, showing component parts. **2** In dark: with light trap and access door removed, place spool over spindle, draw 6 or 7 inches of film through case opening. **3** Replace light trap, make sure rectangular opening straddles film. **4** Turn light trap clockwise to closed position; move safety lever to left, engaging notch in light-trap rim to prevent accidental opening. Replace knob on top of light trap. Loader may now be used in daylight. **5** Tape film to spool, assemble cartridge over film. Make sure cartridge lip is up, projecting end of spool toward bottom of loader. **6** Place assembled cartridge in chamber below knob; make sure perforations engage sprockets. **7** Replace access door with screw. Turn safety lever to right. **8** Turn light trap counterclockwise to open position; safety lever now disengages notch in rim. Set frame counter to 0 by turning knob. **9** Insert wind crank into lower part of case, wind off required number of exposures. **10** Turn light trap to closed position, move safety lever to left-hand position, remove access door, lift out cartridge, cut film.

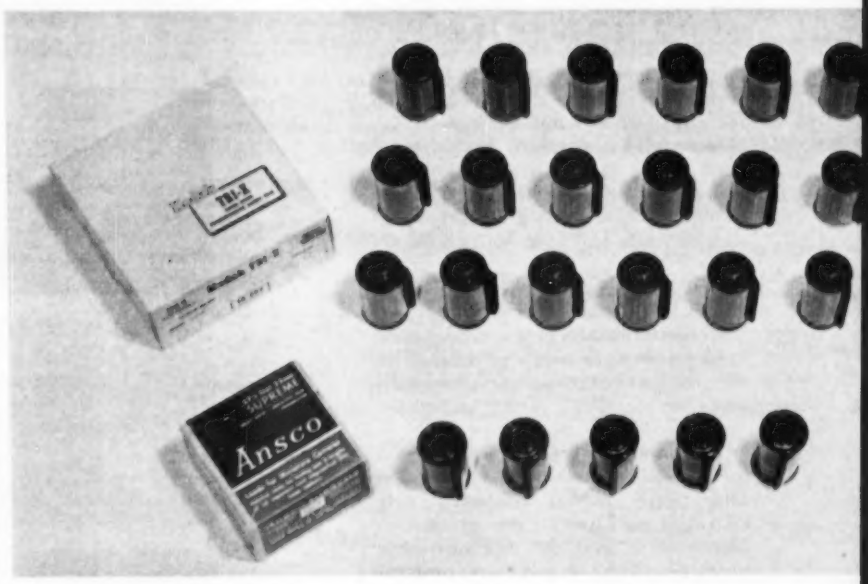
By OTTO BAYER

by using Bulk film

color finisher, to find out if his equipment will adapt to the length you have in mind.

Your first decision, of course, is what kind of a bulk loader you're going to buy. On these pages we've listed examples of the four most common methods. Each does its own job well—you pick the one that fits your needs.

The Watson Model 66 (about $12) typifies the best in a loader which can be used in daylight. Although not as easy or fast to operate as the simpler type listed, it features an air light trap which will never scratch your film, and a posi-

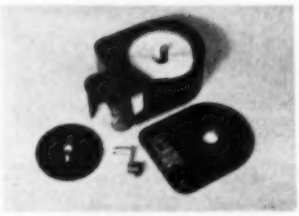


→

Bulk-loading economy is illustrated at right: 100-ft roll makes 18 36-exposure cartridges; 27½-ft roll, 5. You save 60-70 percent on film cost.

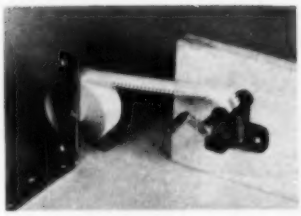
A simple daylight loader

In dark, place film in loader as shown, pull about 4 inches of film through felt light trap. Replace lid (lower right), screw on circular disk. Attach film to spool, reassemble cartridge. Fit cartridge lip into light trap, close door, insert crank, wind number of turns indicated on table for various exposure lengths.



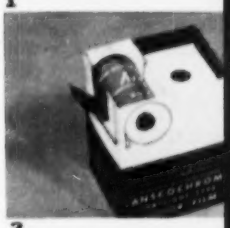
Hand-loading method for darkroom

Simple device shown here is good if you don't load film often enough to want to buy a loader, and have access to a darkroom. Film is placed on bolt suspended between angle brackets screwed to board, loaded onto spool with inexpensive Leitz winder. Number of exposures is judged by amount of film on spool.



Ansco combination daylight-loader and film package

1



2

3

Ingenious new product is the Ansco "Easy Loader," a package of Anscochrome film contained in its own loader. Roll is 27½ ft long (tongued and notched), makes 8 rolls of 20 exposures. **1** Remove cover, unclip film end from cardboard flap, tape to spool, reassemble cartridge. **2** Place cartridge in top compartment, lip firmly in light trap. Hole at top right holds winding knob when not in use. **3** Replace cover, insert knob, give 40½ half-turns, remove knob and cover, tear off film at notch. Clip film to side

tive, easy-to-read exposure-counter.

The simple loader illustrated (about $5) is less bulky than the Watson, easier to operate—but great care must be taken to keep its felt light trap spotlessly clean. Storing the loader in a box or plastic bag will help prevent dust from collecting in the felt trap and scratching the film as it passes through. It's a good idea to check this trap regularly for dirt, brushing it out when necessary with an old toothbrush. Both loaders are made of plastic, and you must be careful in handling them; if they become chipped, they're on the way to developing light leaks.

Even with a "daylight" loader, you'll need at least an improvised darkroom to load the bulk roll into the loader. Use a changing bag, or throw a blanket or coat over the film and shut yourself into a closet.

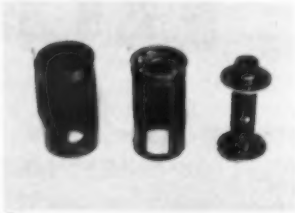
The Ansco Easy Loader is a handy gadget to have around if you're keeping black-and-white film in your loader, then suddenly want to switch to color. This way, color film always has its own loader ready for use. Price of film and loader (not reusable), $9.95.

Your other big concern is whether to use cartridges or cassettes to hold the film. (Some cameras will accept only cartridges, not cassettes; this information should be in your camera's instruction booklet.) This is a knotty problem which you probably will decide on a financial basis, since cassettes cost from $2 to $4 apiece, and cartridges can be had for nothing or bought for very little from your photofinisher or dealer. But if you can afford cassettes, by all means do so. They are made of heavy-gauge metal, as against a much thinner material for cartridges, and will last practically forever. Cartridges have a felt light trap through which the film passes, and this can be a constant source of trouble unless you keep it scrupulously clean and free from loose strands. Cassettes have no felt to touch the film; they work on an air light-trap principle which is ideal. Cartridges will work well for you if you keep them dust-free and don't use them beyond their endurance—toss them out when they begin to get loose, or are bent.

Conditions while you are loading are also important. If the room is dusty, the film you just loaded probably is too. Do a little fast work with a damp sponge first. Once you start loading, don't try to get too much film onto the spool, and don't try to get it on too fast. If you do, you'll cause stresses which produce "cinch" marks all along the film which later turn up as dark lines on your print.

Now that you've spent the same amount of money for film as you always did, but have three times as much film to show for it, don't shoot it all up just because it's there—use it to go out and improve your camera hand.—

Cassettes: a long-term investment



1

This is what a cassette looks like when it has been completely disassembled—from the left, outer shell, inner shell, and film spool.

2

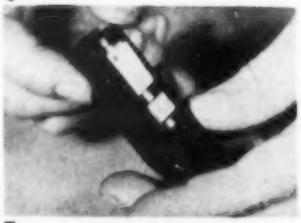
To open the cassette for loading, press latch lever away from outer shell, then push button on top of inner shell until cassette opens.

3

When the cassette has been opened, disassemble it by rotating the inner shell and sliding it out; then remove the film spool from the shell.

4

In the dark, trim the end of the film to a V shape with a template tool (see opposite page), insert into spring-loaded slot in spool.



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If cassette is hand-wound, reassemble it, press top knob, rotate inner shell until it clicks closed. (Cassette must be open for use with loader.)

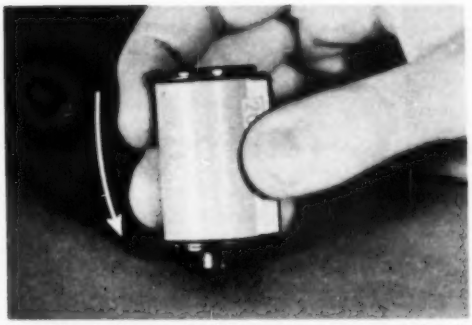
6

When cassette is loaded and closed, lights may be turned on. Pull about four inches of film out of cassette and trim end with template tool.

7

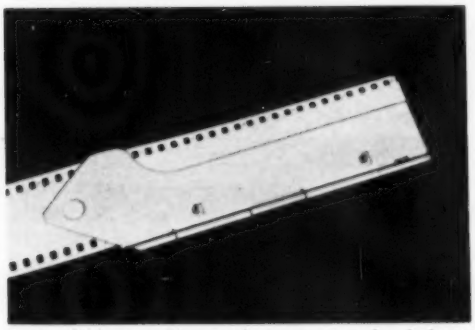
With Watson loader (left) cassette is closed while still in the loader by turning top knob counterclockwise, *then* opening the access door.

Cartridges: economical, handy



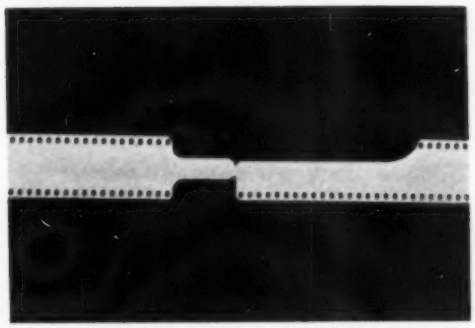
Cartridge is disassembled by tapping spool end sharply on table, hand cupped to catch cap as it comes off. To replace the cap, squeeze body of cartridge slightly.

Trimming tool/template



Device folds over film, teeth engage sprocket holes to hold firmly in place. Use razor blade or scissors to form the leader (curved side) or the trailer (pointed end).

Special features of 27½-ft rolls



These small rolls are especially good for hand-loading, since no exposure-counting mechanism is needed. Film has tongued leader, easy-to-tear notch every 36 frames.

FILMS AVAILABLE IN BULK LOADS

Name of Film	*Color Sensitivity*	*Exp. Index D*	*Exp. Index T*	*Availability*
ADOX				
KB-14	Panchromatic	16	12	50 ft
KB-17	Panchromatic	32	24	50 ft
KB-21	Panchromatic	80	64	50 ft
ANSCO				
Anscochrome, Daylight Type	Reversal color film	32	—	28 ft; makes 8 20-exp. rolls.
Color Slide Duplicating Film	Reversal color film	—	0.5	100 ft
Supreme	Panchromatic	50	32	27½ ft; 100 ft
Ultra-Speed	Panchromatic	100	64	27½ ft; 100 ft
DU PONT				
Superior 2	Panchromatic	50	32	100 ft
Fine Grain Safety Positive	Blue-sensitive	—	1.0	100 ft
Safety Microcopy	Panchromatic	—	6	100 ft
		—	1.6	
GEVAERT				
Gevapan 27 (Microgran)	Panchromatic	32	20	100 ft, 36 exposure daylight refills.
Gevapan 30	Panchromatic	64	40	
Gevapan 33	Panchromatic	125	100	
ILFORD				
Pan F	Panchromatic	16	10	100 ft
FP-3	Panchromatic	64	50	100 ft
HP-3	Panchromatic	200	160	100 ft
KODAK				
Tri-X	Panchromatic	200	160	27½ ft, 50 ft, 100 ft
Super-XX	Panchromatic	100	80	27½ ft, 50 ft, 100 ft
Plus-X	Panchromatic	50	40	27½ ft, 50 ft, 100 ft
Micro-File	Panchromatic	—	16	100 ft
Infrared	Blue, Infrared	—	20	100 ft
High Speed Infrared	Blue, Infrared	—		100 ft
Fine Grain Positive	Blue	1.2	0.3	
		12	3	100 ft
Direct Positive	Panchromatic	64	50	100 ft
Ektachrome, Daylight Type	Reversal color film	32		100 ft
Ektachrome Type F	Reversal color film	20	16	100 ft

35-mm color

THE CURRENT widespread enthusiasm for the 35-mm miniature camera and for color photography are very probably the most closely related phenomena on the photographic scene today. Shooting color in 35-mm costs less per shot, and each frame returns from the processor in a sturdy pasteboard 2x2 mount for ease in viewing or projecting one's creative efforts. But the most important reason for 35-mm fans embracing color, and vice versa, is the outstanding excellence of modern color films.

Three color films dominate the American photographic market. At the head of the list is the redoubtable Kodachrome, which was introduced 'way back in 1935. These twenty years have given the Eastman Kodak Company an unparalleled opportunity to perfect the production and processing of their colorful product. Kodachrome is renowned for its color fidelity, its super grainlessness, and its incredible image resolution which seems to make even the cheapest lenses perform like thoroughbreds. In professional magazine circles it is well known that some top national picture magazines prefer to pull a cover or a two-page spread from part (*Continued on page* 130)

35-mm color from our

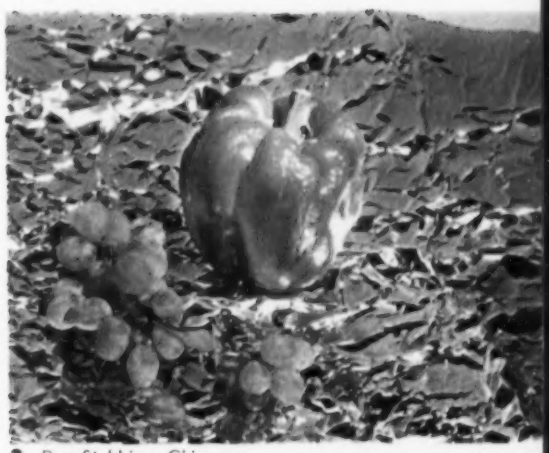
1 Arrangement of oars in a rowboat caught the eye of Rodger LaPelle of Philadelphia. He used a Kodak Bantam with Anastar f/4.5 lens, and exposed at 1/50, f/8, on Kodachrome.

2 Don Stebbing, Chicago artist, made this still-life of grapes and pepper with an Exakta and Kilar 90-mm lens, using two bounce floods. One second, f/16, on Ansco Color Tungsten.

3 Pretty model was caught in mid-air by Irwin L. Savitt of Douglastown, N. Y., with a Leica IIIc. He shot at 1/60 second, f/8, on Kodachrome Type A film with conversion filter.

4 Swimming lesson was photographed by Mary Marley of Jackson Heights, N. Y., who used a 35-mm Certo Dollina and Kodachrome Daylight Type film. Her exposure: 1/50 second, f/8.

1 Rodger LaPelle, Philadelphia



2 Don Stebbing, Chicago

3 Irwin L. Savitt, Douglaston, N. Y.

readers

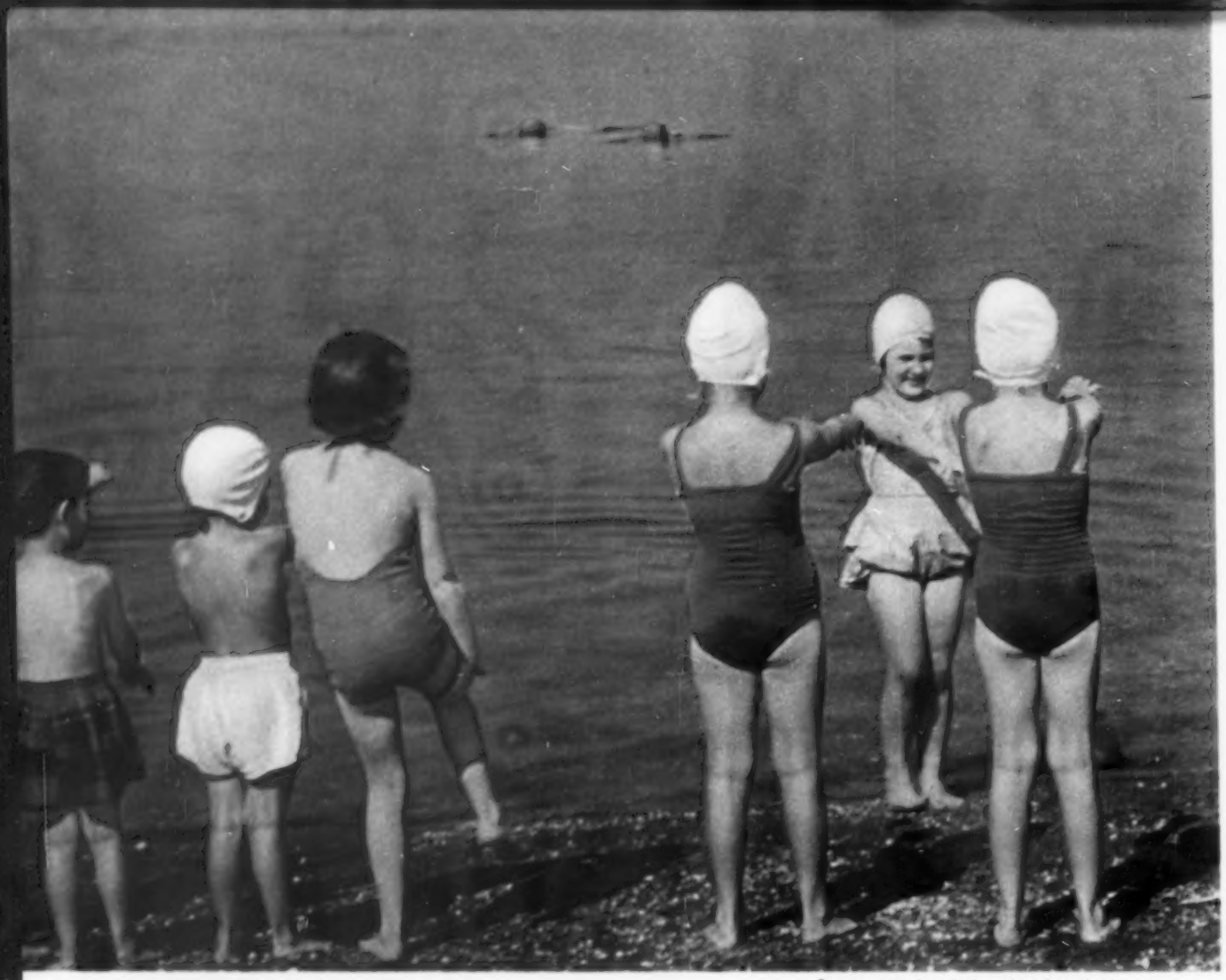
5 Close-up portrait of his little daughter Debbie was made by Franklin M. Young of Truro, Mass., with 35-mm Exakta V on Kodachrome. Exposure was 1/50 second at f/8.

6 Bullfrog was shot in simulated natural habitat by Harold E. Berry of Wellesley, Mass. He used a 4x5 Speed Graphic with 828 adapter back, two floods, and Kodachrome film.

7 Hawaiian sugar mill under overcast sky was photographed by George W. Fey of Washington, D. C., who used a Bolsey and exposed at 1/200 second, f/4.5 on Kodachrome.

8 Robert B. Harry, Jr., of Waynesboro, Va., caught two small peach tasters with Contax IIIA, shooting at 1/50 second, f/6.3 on Kodachrome film, through a Skylight filter.

continued on next page



4 Mary Marley, Jackson Heights, N. Y.

35-MM COLOR continued

5 Franklin M. Young, Truro, Mass.

6 Harold E. Berry, Wellesley, Mass.

continued on next page

7 George W. Fey, Washington, D. C. **8** Robert B. Harry, Jr., Waynesboro, Va.

Without Filter

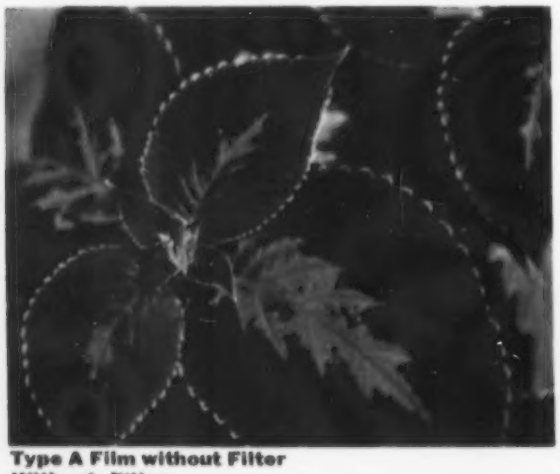
With Skylight Filter

By John P. Huger

Daylight Film without Filter

Daylight Film with Filter

By Mel Grayson



Type A Film without Filter
Without Filter

Type A Film with Filter
With Polarizing Filter

By Norman Rothschild

Filters for color

color series part 4

The four most useful filters for color shooting

Although there are a vast number of filters for color photography available, only four will serve most of the day-to-day needs of amateur shooting. High on the list is a Skylight filter or its equivalent, which is used to reduce the excess blue in open shade, on overcast days, and in distant scenes. In the photograph of a pigeon on the opposite page notice how addition of a Skylight filter gave warmer, more natural-looking colors. If you must use a daylight-type film with artificial light, a conversion filter should be used to prevent excessive warm, orange tones as shown in the pair of portraits at left, exposed by floodlamp. Daylight film loses considerable speed when used with a filter for artificial light, and therefore this technique is recommended for emergencies only. However, indoor-type films such as Type A can be converted to daylight use with little or no loss in film speed. If Type A film is used in daylight without a conversion filter the colors will be excessively blue, as shown in the two pictures of leaves reproduced at left. The best way to darken blue skies in color film is to employ a polarizing filter. As polarizing filter is rotated darkening effect increases from zero, far left, to maximum strength, shown at left.

By NORMAN ROTHSCHILD

LITTLE WONDER if the myriad filters for color photography sometimes bewilder the beginner. Faced with a confusing array of conversion, color-compensating, light-balancing, polarizing, and other filters, often with each manufacturer following his own nomenclature, the newcomer to photography is tempted to throw up his hands in despair. Actually, each of these filters is made available for very good reasons. The purpose of this article, the fourth in POPULAR PHOTOGRAPHY's Color Series, is to help you understand the uses of the various color filters available.

To begin with, color film doesn't have a built-in brain. If it did it might adjust itself automatically to whatever kind of light we wanted to take pictures with. Because color film can't make this adjustment manufacturers offer it in several different types. Each type is designed or adjusted to "see" properly when used with a particular kind of light. If the color of the light is changed, a different light source is used, or the wrong film used with a certain kind of light, then the film will no longer *(Continued on page 100)*

see chart on page 98

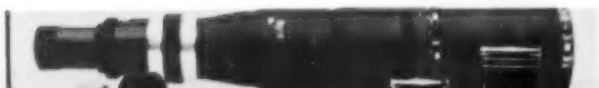
↑
Susan Sherman. Contax I, 50-mm Tessar f/2.8; 1/100, f/5.6, Supreme

←
Louis Stettner. Leica, 50-mm Summitar f/2; 1/100, f/5.6, Plus-X

→
David Vestal. Contax, 50-mm Sonnar f/2; 1/10, f/2, Super-XX

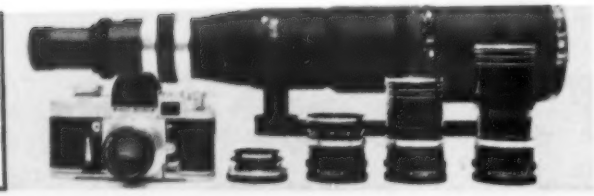
35-mm pictures: still life

WHEN THE SUBJECT is inanimate, there is no need for fast lenses and shutters, or for speedy camera operation. Still, the 35-mm camera has its advantage of relatively greater depth of field, when desired; and the wide aperture is indispensable when the subject is poorly lighted—as is David Vestal's kitchen-tabletop. Susan Sherman photographed sea grapes against a distant Caribbean shoreline, intentionally overexposing and printing for high contrast. Louis Stettner's bent bus-stop sign is a bit of unusual urban detail. A tripod is often useful in this kind of work, to avoid camera movement.



subject is poorly lighted—as is David Vestal's kind of work, to avoid camera movement.

35-mm



You can control space and perspective by using

interchangeable

Bob Henriques

With long-focus lenses, you can work from a great distance, still fill the negative area with the main subject. At long distances, spatial relationships are compressed, far objects look larger than normal, backgrounds closer.

Subject distance—not the

2a section of 28-mm shot enlarged to match 50-mm

lenses

By ARTHUR BARNEY

THE modern miniature camera's ability to accept interchangeable lenses is one of the keys to its tremendous flexibility. Is your normal lens too short to catch the facial expression of the pitcher from your seat high in the stands? A few seconds is all the time needed to switch to one of the hundreds of telephoto lenses up to 1,000-mm in focal length which are on the market today. And if your normal lens is too long there are myriad short focal lengths running down to the 21-mm *f*/4.5 super wide-angle Zeiss Biogon.

Time was when only the most expensive top-drawer beauties offered this versatility. Today, however, many coupled-rangefinder and single-lens reflex 35-mm cameras down around the $100 price bracket (one selling for less than $50) offer lens interchangeability. Two interesting new cameras, the Zeiss Contaflex and the Kodak Retina IIIc offer a new commodity: semi-interchangeability. In the case of the Contaflex, accessory lens elements slide in over the camera's standard lens to give either a wide-angle or a telephoto effect. The Retina IIIc achieves this flexibility by exchanging the front cell of the normal lens for either a wide-angle or a telephoto cell while employing only the rear cell of the standard lens.

One of the (*Continued on page* 84)

Thomas Holleyman, Standard Oil

With wide-angle lenses you can get in closer to the main point of interest and still cover a broad area, keep both near and far objects in acceptable focus. Here spatial relationships are expanded, distant objects reduced in size.

continued

3a section of 28-mm shot enlarged to match 135-mm

Subject distance—not the focal length—controls perspective

2a section of 28-mm shot enlarged to match 50-mm

All these pictures were taken at 25 feet

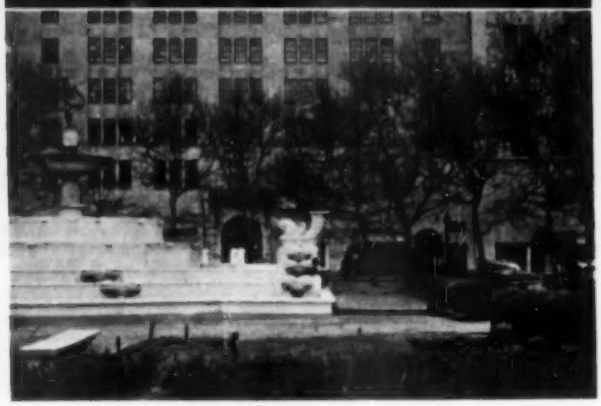
1 28-mm lens, full frame

2 50-mm lens, full frame

All these pictures were taken at 100 feet

5 28-mm lens, full frame

6 50-mm lens, full frame



6a section of 28-mm shot enlarged to match 50-mm

3a section of 28-mm shot enlarged to match 135-mm

Careful scrutiny of all the pictures at left and below will demonstrate the principle that regardless of what lens you're using, perspective will always be the same if the distance is the same. Notice the relationship of the statue, doorway, and truck to the figure of the man—in all pictures at same distance, those objects appear the same *size* in relationship to each other. Enlargements from 28-mm picture to match exact area of long-lens shots are, of course, more grainy, and are presented only for comparison purposes. Choose the lens which will fill the negative with the picture you want; to change perspective, change lenses and move nearer or farther away.

3 135-mm lens, full frame

4 135-mm full frame—compare to 100-ft shot below

7 135-mm lens, full frame

8 135-mm enlarged to match 135-mm at 25 ft

7a section of 28-mm enlarged to match 135-mm

An obvious change in perspective is illustrated by pictures 4 and 8, above, taken with the same lens at 25 and 100 feet respectively. The blow-up of the 100-ft shot was made so size of statue was approximately the same in both pictures. Note how figure of man (*nearer* than statue) is smaller, truck and building larger in the more distant shot. A quick look at the comparison may lead to the erroneous conclusion that camera position was more to the left in the 25-ft shot. But camera was moved straight back on a line in the pavement to the 100-ft mark. This optical phenomenon can be put to creative use (next page).

6a section of 28-mm shot enlarged to match 50-mm

first things we must settle is this business of calling some lenses "normal" and others "short," "wide-angle," "semi-wide-angle," "long," or "telephoto." Let's take these things in order.

How normal is normal? Usually, a "normal" lens is one whose focal length is somewhat longer than the diagonal of the negative that it has been designed to work with. The vast majority of 35-mm cameras utilize a 24x36-mm format whose diagonal comes to 43.2-mm. The most popular "normal" lens for the 35-mm camera has always been the 50-mm lens. But many popular cameras today come equipped with a 44- or 45-mm lens as standard equipment. One very popular "normal" lens in the single-lens reflex field is the 58-mm focal length. All of these focal lengths are sufficiently close to the negative diagonal to be called "normal."

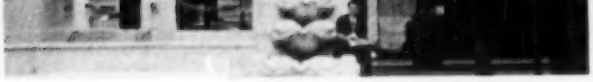
When lenses have focal lengths significantly shorter than the diagonal of the negative we call them "short," "wide-angle," "semi-wide-angle," or "super-wide-angle." As these descriptive adjectives indicate, the shorter the focal length of a lens, the greater is its angle of view. This (*Continued on page* 131)

If image size is the same depth of field is the same

The two pictures below refute the popular misconception that long-focus lenses have inherently narrow depth of field. Camera-to-subject distance was adjusted in using two different lenses so that image of girl was the same in both shots. Same lens opening was used in both cases, and the resulting depth of field is also the same for both.

Taken with 135-mm lens at about 75 feet; f/11.

Taken with 35-mm lens at about 30 feet; f/11.



7x section of 28-mm enlarged to match 135-mm

was moved straight back on a line in the pavement to the 100-ft mark. This optical phenomenon can be put to creative use (next page).

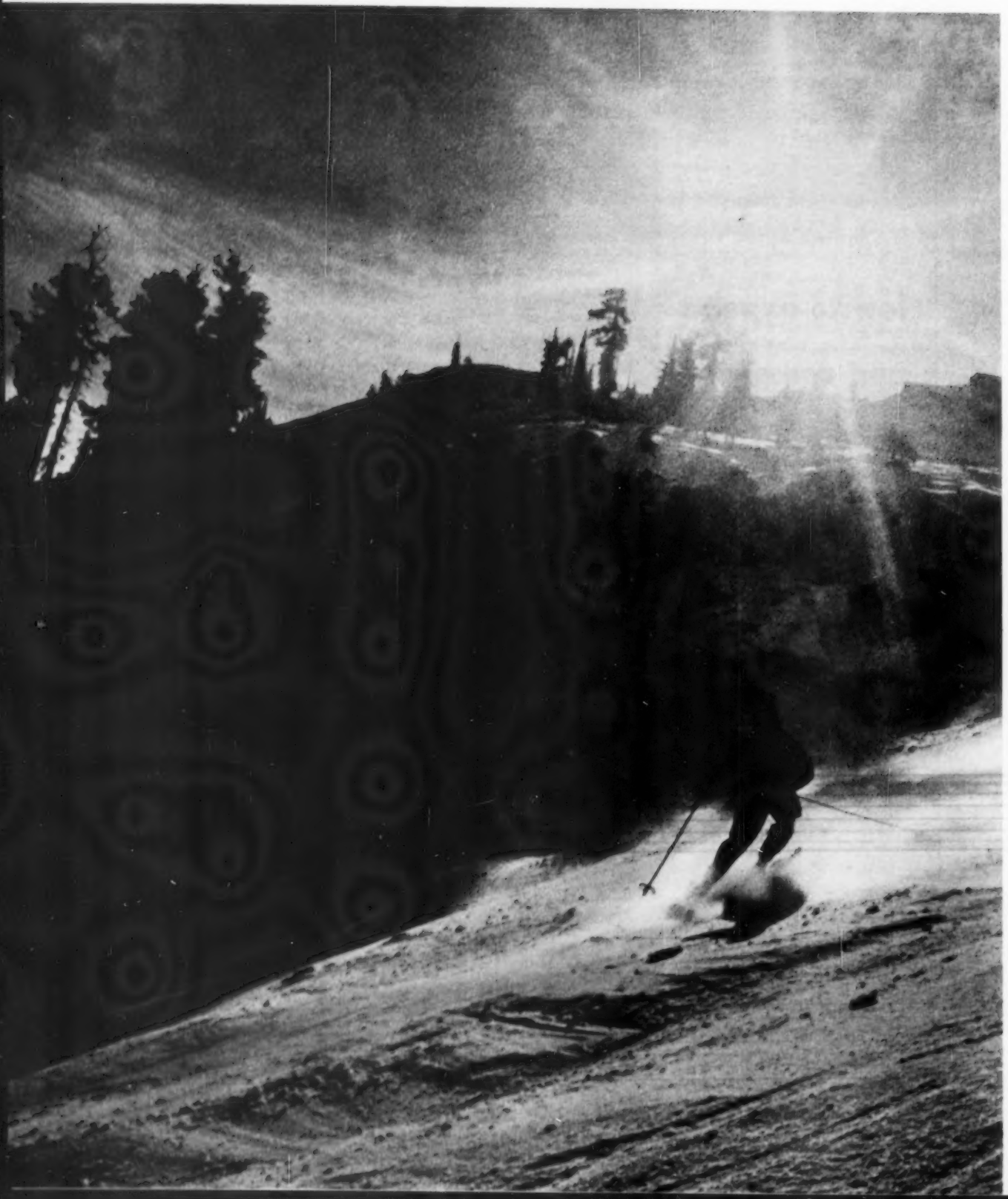
21-mm lens, 4 feet

How to expand and compress space relations

80-mm lens, 12 feet

The why and wherefore of using different focal length lenses to get different effects is graphically illustrated at right. Three different lenses were used, at distances calculated to render the girl the same size in all three shots. But notice what has happened to the size of the tower in the background! From a small spot about the size of the girl's face (in the wide-angle picture) it fairly towers over her in the 400-mm picture. The picture in the middle was taken with a 50-mm lens—normal for the 35-mm format, and representing the original scene most closely to the way our eyes would see it. Top picture also shows what happens when you get too close to a subject—hand looks abnormally large in relationship to the rest of the body. Even such a relatively short distance (from the hand to the body) is exaggerated when the camera is very close. This is why relatively great distances are usually desirable in portraiture—to maintain the large image size of the closeup, switch to a long-focus lens and move farther from the subject.

400-mm lens, 96 feet



35-mm pictures: landscapes

Courtesy Harper's Bazaar

DEVOTEES of the miniature camera are fond of saying it can do anything. This isn't necessarily so, but it's interesting to see how many different kinds of photographs it can make well. Landscapes, for example, the traditional province of the larger camera. In skilled hands like those of Bob Willoughby, the 35-mm camera makes a beautiful, tack-sharp landscape—and stops some fast action to boot. Bob made this backlighted skiing picture in Squaw Valley, Calif. Note the fortunate choice of a wide-angle lens for this kind of subject matter. A 28-mm objective offers a 75-degree field of view, compared to 45 degrees for the normal 50-mm lens.

Bob Willoughby. Nikon, 28-mm Nikor f/3.5; 1/500, f/5.6, Super-XX

Exposure and development are equally important in 35-mm work

ONE OF THE SADDEST creatures of our technological civilization is the photographer who has forgotten what photography is all about. Photography means making photographs. Cameras, films, lenses, meters, darkroom equipment, chemicals, and all the related gadgets and gizmos have no purpose save to help us make better pictures.

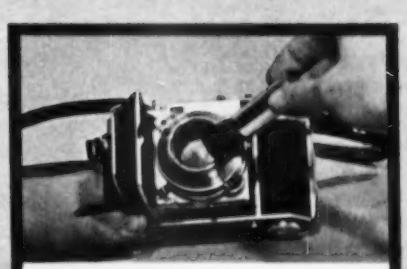
Four years ago Martin Munkasci wrote an article for POPULAR PHOTOGRAPHY in which he pleaded *Don't Let Technique Kill the Cat* (Nov. 1951). Unfortunately, many photographers have not only killed the cat but have embalmed it, stuffed it, and mounted it on the wall as a sort of idol. These people are so terribly immersed in technique and technicalities that they hardly ever find the time or the strength to make pictures. And when they do make occasional photographs they are so infatuated with the technical side of the venture that what pictures they do make are dull and uninteresting.

The first step in avoiding this pitfall is to keep your equipment as simple as possible. How much equipment you really need will naturally depend upon the scope of your photographic interests. Many photographers find that one camera with a single lens and a few accessories is all they need—and they have the pictures to prove it. Most professionals who use the 35-mm camera seem to agree upon the need for two or three camera bodies and from three to six interchangeable lenses of various focal

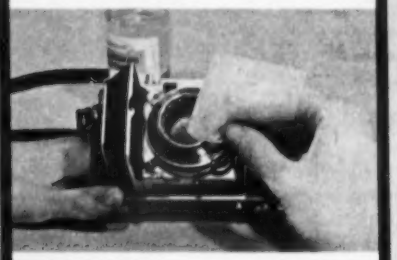
35-mm processing

Cleanliness begins with the camera . . .

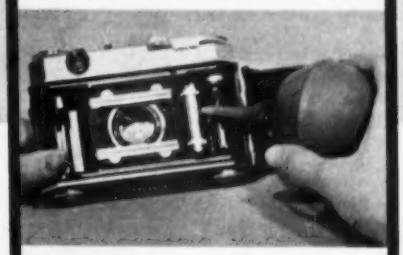
Development of miniature negatives requires careful attention to cleanliness, exposure and the make-up of film processing solutions



Loose dirt adhering to exposed surfaces of lens is easily flicked off by gently stroking with soft brush.



Dried debris on lens surfaces has to be removed with soft lintless tissue dipped in special solution.



Stream of air from bulb-type blower will dislodge paint and film chips from interior of camera body.

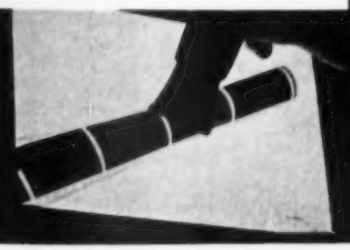
←

Thirty-five-mm negative handling is a matter of craftsmanship combined with the worker's awareness of the capabilities of the process.

By BOB SCHWALBERG

lengths. A happy medium for the advanced amateur and beginning professional falls somewhere in between.

The second step is to standardize your exposure and processing techniques. This will minimize the variable factors in the photographic process and thereby eliminate unnecessary complications in your efforts to portray your subject matter. A sound beginning is to pick one film and only one developer for all of your work until you are sure of your equipment and (*Continued on page* 112)



Anti-static brush can be helpful in removing dust and lint particles from surfaces of film strip.

Light application of petroleum jelly to negative surfaces fills in scratches and removes dust.

turn the page for processing . . .

Processing for optimum picture quality

TIME-TEMPERATURE DEVELOPMENT, GROUP 1 & 2 FILMS

(See film classification chart, page 65)

Time, in minutes, for 68 F with intermittent agitation
Data is for subjects of average contrast only

GROUP 1 FILMS (at indicated film speeds)

DEVELOPER	ADOX KB-17 80-D; 40-T	ADOX KB-14 25-D; 20-T	ILFORD PAN-F 16-D; 10-T	GEVAPAN 27 32-D; 20-T
D-76	10-12	8-10	8-9	10-12
PROMICROL	8-10	7-9	7-9	9-11
CLAYTON P-60	8-10	6-8	6-8	10-12
NEODYN-BLUE*	20-24	12-20	12-18	**
NEODYN-RED*	12-16	8-12	**	12-18
MINICOL	8-10	6-8	6-8	9-12
X-33	9-12	8-10	8-9	9-13
MICRODOL	10-12	8-10	8-10	12-14

* *Time given for developing 2 rolls simultaneously*
** *Not recommended*

GROUP 2 FILMS

DEVELOPER	ALL GROUP 2 FILMS AT MFR'S SPEED RATING	ALL GROUP 2 FILMS AT 125-160 SPEED, AVERAGE LIGHTING	KODAK PLUS-X AT 320 SPEED, AVG. LIGHTING
D-76	7-9	10-12	**
PROMICROL	6-8	8-10	12-14
MICROPHEN	10	8-10	12-14
CLAYTON P-60	8-10	12-14	**
D-23	8-12	12-14	**
FINEX-L	8-10	**	**
EDWAL 20	12-14	**	**
X-33	8-10	**	**
MICRODOL	12-14	**	**

** *Not recommended*

Superb quality of this 35-mm scenic is attributable to use of thin-

turn the page for processing . . .

emulsion Adox KB-17 film, carefully processed in matched developer—Neodyn Blue.

ONE OF THE MARVELS of 35-mm photography is the fact that with careful attention to film and developer selection and exposure and processing technique, it is possible to produce results that can readily be mistaken for work produced with larger cameras.

It is not a matter of fine grain alone. Quality is concerned with sharpness, tone gradation, highlight and shadow detail, as well as an almost invisible grain pattern that does not obtrude upon the image portrayed.

Half the story of 35-mm quality is in the taking of the picture, the other half in the darkroom. Selection of film and developer must be considered as a complete entity—the film-and-developer team. An inherently flat film in an over-active developer may give a result far more contrasty than that obtained from a contrasty film in a normal-energy developer. A film capable of maximum resolution generally performs very poorly if developed in a formula designed for minimizing the grain pattern of more grainy films.

The film-and-developer combination determines the general exposure index, the degree of graininess, resolution, contrast, and the latitude or margin of error permissible in exposure and development. In general, for best-quality prints, the film should be fast enough, but no faster than we absolutely need it to be, because every increase in speed is generally accompanied by some decrease in quality. The developer should balance the contrast characteristics of our film. Slightly contrasty films usually do better in slightly flat developers, and vice versa, the idea being to choose a developer which will give good negatives under a wide variety of lighting and subject conditions.

The accompanying summary tables are intended as a guide to optimum 35-mm picture quality. Use them as a starting point in your quest for outstanding results.

Processing for maximum film speed

TIME-TEMPERATURE DEVELOPMENT, GROUP 3 FILMS

(68 F with intermittent agitation)

A Ansco Ultra-Speed, Kodak Super-XX, Ilford HP-3 and Gevapan 33 exposed on basis of 160-320 speed.

D-76	11-13 min	200
PROMICROL	12-14 min	200
MICROPHEN	12-16 min	320
D-23	12-13 min	160

B Kodak Tri-X exposed at indicated speed ratings.

D-76	11-13 min	650-800
PROMICROL	9-12 min	650-800
MICROPHEN	12-14 min	650-800
D-23	12-13 min	400-450

C All Group 3 films with flash.

PROMICROL	7-9 min	Users of electronic flash may want to add several minutes to obtain additional contrast
MICROPHEN	10-12 min	
D-23	10-12 min	
MICRODOL	12-13 min	
CLAYTON P-60	8-10 min	

AVAILABLE-LIGHT photography is no longer the exclusive domain of the man with the $f/2$ lens. New faster films like Kodak's Tri-X and superior developers like Microphen and Promicrol have improved the quality of available-light photography and increased the number of photographers participating in this fascinating field.

No camera type is better suited to available-light work than the 35-mm miniature. Most of the medium-priced instruments are equipped today with either $f/3.5$ or $f/2.8$ lenses, and an $f/3.5$ lens today is capable of about the same performance that an $f/2$ lens was capable of just a few years ago.

Most available-light situations are both contrasty and flat at the same time—contrasty because the ratio between highlight and shadow illumination is usually very high; flat because our main interest usually lies within the shadow and middle-tone areas. The trick then is to employ a film-and-developer combination which suppresses over-all contrast (preventing blocked-up highlights) but which also digs into the shadow areas to give us detail and contrast in the poorly illuminated portions. Overdevelopment in an active developer is not desired for we want to minimize grain and sharpness losses as well as highlight blocking.

Because we are working at the limits of the film's sensitivity—what the technicians call the "toe of the curve"—increased exposure will add more density to the highlights than to the shadows. This is exactly the reverse of the normal rule when exposing film under normal full-range conditions in which exposure works more efficiently in the shadows than it does in the highlights. But development of available-light negatives works in the same way as development of any other kind of negative, building highlight density at a higher rate than shadow density. The general rule for good available-light technique therefore is: Give the shortest exposure which, when fully developed in a soft-working developer, will yield a full range of tone values.

→

ASA 800 film speed under general big top lighting—1/50 sec. $f/5.6$; 35-mm Tri-X developed 12 min in Promicrol.

10

35-mm Enlarging

THE problems of enlarging 35-mm negatives are like those of any other negative format—only more so. Because our negatives measure slightly less than one inch high and one and a half inches long, almost every enlargement is a "big blowup." To use most of the area of a 24x36-mm negative to fill most of the area on an 8x10 piece of enlarging paper means magnifying every image point and grain clump seven and one half times. But 11x14 prints requiring a minimum of at least 10 diameters and even bigger enlargements are quite popular today. What they require is good technique.

The first step in making a really good enlargement is to make a good negative. This means a negative which will readily yield the kind of print quality we want with the enlarger and printing paper we are accustomed to using. Because almost nobody wants grain, about the only dogmatic thing you can say by way of defining good negative quality is that the negative should contain the least amount of over-all density which we require, so that graininess will be minimal. Contrast requirements will vary largely according to the type of enlarger you work with. The important thing is that you have adequate detail in both the highlight and shadow portions of the negative, unless you are striving for a special effect.

Enlargers may first be divided into two broad classifications: those which use a soft, diffused light source and those which use a hard, very directional light. Enlargers of the first type are called diffusion enlargers and are noted for soft-contrast gradations and some loss of critical sharpness. Most of these machines use a lamphouse which is either painted white or silvered on the inside, and filter the light output through one or more layers of opal or etched glass before it passes through the negative. Hot- and cold-cathode lamp houses—generally called "cold-light heads"—fall into the diffusion category.

The higher-contrast type of light source usually consists of a darkened lamphouse with an incandescent lamp placed one focal length away from a double set of optical condensers which straighten out and concentrate the light rays from the bulb. These enlargers produce prints which are both sharper and very much more contrasty than those produced by diffusion types.

In terms of effect there is quite a bit of overlapping between the two forms of construction. Many enlargers are made with a white-coated lamphouse and a single condenser, the flat side of which flops down on the negative to hold it in place while the print is being made. Although these machines do employ a condenser, they are not really "condenser enlargers" because their effect is very much more like that of the diffusion types, in that they give very soft gradation. Many other double-condenser machines minimize the condenser effect by introducing a layer of ground-glass or opal glass before the negative carrier and a few even grind the upper flat surface of one of the condensing lenses. The effect of these machines is a cross between that of a straight-condenser and a straight-diffusion construction. One very interesting new enlarger light source is the Aristo HI Vari lamp, a popular cold-light head. This HI (High Intensity) head seems to combine the speed, resolution, and contrast of the condenser type with the basic advantage of all cold-light and diffusion types—their ability to minimize the effect of dust and dirt on the negative. *(Within the next few months a complete report on the Aristo HI Vari lamp will*

Normal-contrast negative has heavy but still transparent silver deposits in highlights and a few shadow areas with no silver at all. This will give detail in highlights and shadows, printing best in diffusion, semi-diffusion or condenser enlargers.

High-contrast negative has dense, opaque highlight areas and thinner shadow regions ranging down to clear gelatin. Usually dense, this type negative can be on the thin side as well, printing best in soft enlargers such as diffusion or semi-diffusion types.

Low-contrast negative has an almost even deposit of silver density with little variation between maximum and minimum densities and print best in high-contrast straight-condenser enlargers. Usually thin, a low-contrast negative may also be dense.

By RALPH CARROLL

High-quality prints can be made from miniature negatives.

appear in POPULAR PHOTOGRAPHY.—Ed.)

Once you get used to working with one enlarger type for any length of time you will come to know its requirements in terms of over-all negative contrast. A slightly thin, slightly flat negative enlarged in a straight double-condenser enlarger can give exactly the print contrast of a slightly heavy, slightly contrasty negative enlarged by some diffusion systems. Insofar as the enlarger is concerned it is our opinion that it is far and away easier to lose excessive contrast than it is to gain contrast. For this reason our preference runs strongly toward more-contrasty light sources in enlarging. A second very decided advantage of the more-contrasty enlarger is its superior definition, particularly when it comes to stretching thin, flat negative areas which contain a weak amount of detail and contrast. The other side of the coin is the overemphasis of every bit of grain, dust, dirt, and what have you on your negative. Cleanliness is an essential part of any 35-mm technique, but it is particularly important in connection with the condenser enlarger.

Dust, dirt, and minor abrasions can very easily be minimized by coating both sides of the negative with a thin layer of vaseline, using the thumb and forefinger in steady, even strokes. The vaseline will not injure the negatives and will eliminate dust spots. Abrasions will appear less well-defined and slightly unsharp by this technique, but they will not be totally eliminated. Minor dust problems can best be solved with a soft camel's-hair negative brush before resorting to vaseline, however.

The image in a black-and-white negative consists of a pattern of clumps of silver suspended in gelatin. In between the tiny clumps are clear or semi-clear patches which were occupied by silver crystals before the clumping took place. Because these clumps are more dense than the empty pockets surrounding them, the phenomenon we call graininess always appears as light patches against a dark background. Graininess is always most apparent and most troublesome in the gray middle-tone areas of the print. An average grainy negative will show no graininess in the bright highlights or dark shadows (*Continued on page* 124)

This grainy negative was enlarged 30 diameters in order to show the grain pattern clearly. Focused carefully on the grain, the top picture is grainy and sharp. The lower picture was misfocused in the enlarger and is grainless but unsharp. For print sharpness, the enlarger must always be focused sharply on the grain.

The Kodak BULLETIN

The IIIc family &

—and prints that save you time in summer by drying faster . . . stretching focus from here to infinity with the new ultra-fast films . . . the Case of the Frustrated Quality Control Engineer . . . pushing more air through a slide projector with less noise . . . and big paper transparencies on Kodak Translite Paper

IIIc addenda

You probably saw this ad on the back cover of this magazine last month. The picture shows many of the elements that

go with the Kodak Retina IIIc Camera to make the IIIc system. Only we didn't give the names of everything and people have begun to ask us. So here's a brief summary of what's in the picture, starting from the top.

First there's the Kodak Table-Top Camera Stand Kit, Model B, for close-range and table-top work, $34.50. Then there's the Kodak Standard Flasholder with bracket and flash post adapter to fit the Retina IIIc, $9.95. For those interested in photomicrography, there's the Kodak Retina Microscope Adapter Kit, Model B, $59.50. For ultra close-ups, the Kodak Retina Close-Up Kit, Model B, $43.50. The Kodak Retina 80mm Auxiliary Lens reduces the near-focusing distance of the Longar Lens Component from 6½ feet to 3½ feet, $16.50. Then there's the Kodak Retina 50-80 Sports Finder, $8.75 including leather case. The Kodak Retina Close Range and View Finder Kit, Model B, permits hand-held rangefinder-focused picture taking from 3 feet down to less than 1 foot, includes parallax-correcting viewfinder, two auxiliary lenses and case, $36.50. And the Kodak Retina 35-80 Optical Finder which shows the field covered by the 35mm and 80mm lenses, $17.50 including case. The plush-lined leather Kodak Retina Field Case, Model B, is $13.50. The Kodak Retina Curtar Lens Component gives you a 35mm wide-angle *f*/5.6 lens, coated and fully color corrected, $62.50. The Kodak Retina Longar Lens Component, 80mm telephoto *f*/4 is $82.50. And, of course, the Kodak Retina IIIc Camera itself with *f*/2 lens, 1/500 shutter, built-in exposure meter, linked shutter and diaphragm, thumb-lever film advance, and just about everything else you could think of, $185. Your Kodak dealer can fill you in with the details. You ought to know about them. And about the $135 Kodak Retina IIc which uses the same auxiliary items.

Q. C. E.

Back in the shop where we make our miniature cameras there's a group of men who go around with fire in their eyes and suspicion in their souls. Their job is to see that every camera that comes off the line is as good as we know how to make it. Or better.

They're called Quality Control Engineers. Follow one around for a while and you'll think he's working for you, not for us. As a matter of fact, he is.

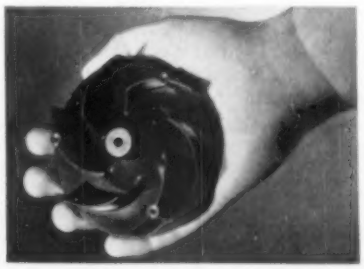
Usually, one of these men is assigned to a single product, like the Kodak Signet 35 Camera. His rounds take him

from the laboratories where the raw materials are tested, up and down the assembly lines, and to the quality control testing laboratories where the final product is given the works. If he sees something he doesn't like, he does something about it. His work starts long before a camera is ready for market, continues indefinitely.

The Quality Control Engineer assigned to the Signet 35 has the most frustrating job of all. He has been picking it apart ever since it came off the drawing board, but it's hard to find anything wrong. For this camera was correct from the word go.

Sure, there have been some minor changes. We changed the style of the focusing lever so it harmonizes with the shutter-release bar. We changed the color contrast in the rangefinder slightly. But that's about all. Except for the price. That we changed to $75. And that makes the Kodak Signet 35 the biggest bargain in miniature cameras today. It has the finest miniature-camera lens we make, a Kodak Ektar *f*/3.5, *Lumenized;* a ball-bearing lens mount; a precision rangefinder, and a host of other features your Kodak dealer would be only too glad to show you. See him soon.

The smoother pusher



We have remarked from time to time that the *impeller*-type blowers of our Kodaslide Signet 300 and 500 Projectors are quieter and more efficient than ordinary propeller fans. The reasons are interesting. Basically, a fan *chops* at the air (like a cleaver or a sabre dancer), while an impeller *scoops* the air up smoothly (like a spoon). Furthermore, the impeller builds up a "pressure head" inside the lamphouse, while a fan doesn't. (It's the difference between blowing air

the 13th floor

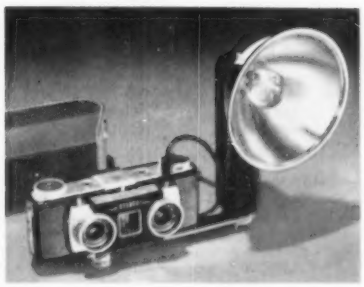
through a tube, and trying to fan it through with a paddle.) The result is that the impeller produces a smoother air flow, with less turbulence, less hissing. Take a look at those graceful turbinate curves, and you get a pretty good idea why it's better. The impeller also costs a bit more than a fan, but we think it's well worth the difference; it helps us keep the $59.50 Signet 300, and the $72.50 and $79.50 Signet 500, at the top of the class.

How big will stereo?

We sat in on a hot discussion recently. About stereo cameras. One man was betting that, by 1958, there will be a third of a million stereo cameras in active use. Another was betting on a million in the United States alone.

Privately, we think it's anybody's guess. But we can safely voice one opinion: if stereo *does* grow to the million level by 1958, the new Kodak Stereo Camera will have a lot to do with it.

Why? Because this Kodak Stereo Camera is just what's needed to blow away the fog of theory and make stereo



a pleasure. It takes the emphasis off esoteric talk and technical maneuvers, and puts the stress right where it belongs —on good pictures. It's fast in operation, it's a delight to handle, it prevents errors, it gets the picture while people with other stereo cameras are still trying to measure how far it is to the subject. And it's priced at $84.50.

If you're lucky enough to own a Kodak Retina IIIc Camera you have a self-timer built in. If not, don't be too unhappy, because a Kodak Auto-Release will do the same for any camera with a cable release socket. Costs $3.86.

From here to infinity

In pursuit of the fast "f" number, you may have overlooked the other end of the scale. Close down to the smallest opening your camera has, and you get those vistas with grass at 3 feet and pine forests at miles, all sharp as a tack.

"Crescendo perspective" we've heard it called.

It used to be that such scenics called for tripods and such. No more. Load up with Kodak Royal Pan or Tri-X Film (daylight rating of 200), stop your camera all the way down. You can still shoot at speeds fast enough to eliminate hand-held motion sickness, you get every inch of field depth your camera can give you, on a negative you can blow up and up.

Starting point—a package of Kodak Royal Pan Film or roll of Tri-X Film at your Kodak dealer's.

No broomsticks

We note, as a matter of interest, that Kodak's nineteen-story headquarters building at Rochester has a thirteenth floor. This is fairly unusual in tall buildings, where the floor numbers usually step blithely from 12 to 14. It proves that Kodak is not superstitious. As a matter of fact, we said good-bye to magic and superstition many years ago, when the Kodak Research Laboratories were established.

We agree that films as fast as Kodak Tri-X and the new-type Ektachrome Films seem like witchcraft; that lenses as sharp as the Kodak Ektar Lenses smack of wizardry; and that the superb

quality of such papers as Kodak Medalist and Opal may suggest we have a few senior-grade thaumaturgists in our midst. Not so. The lenses are pure mathematics (generated with the aid of some extremely fancy electronic computing equipment). The films and papers represent a high order of physics and chemistry. Our laboratory people wear white lab jackets, not alchemists' robes; and they ride on slide rules, not broomsticks. We think science is better than Hecate, and research is better than Merlin.

(By the way, the Research Laboratories are not in our nineteen-story building. They're too big, and are away out at Kodak Park, where the films and papers are made.)

Quick and timely

▶ Do your enlargements take too long to dry? That's because regular paper soaks up a lot of water. But *Kodak Resisto Rapid N Paper* (with its special water-resistant base) gives you a dry print in 7 or 8 minutes. Speed and other characteristics are the same as Kodabromide; the price is only a little higher. Finished prints are *tougher*, too; will stand more wear and handling than other prints. Try some.

▶ New free folder about big translucent *paper* prints for rear illumination, commercial display, etc.—black-and-white, toned, or hand-tinted. Title: *Translucent Photographs with Kodak Translite Enlarging Paper and Kodak Translite Film.* Ask our Sales Service Division.

Prices include Federal Tax where applicable and are subject to change without notice.

Kodak
TRADE-MARK

EASTMAN KODAK COMPANY, Rochester 4, N. Y.

FILTERS FOR COLOR

The right combination for every film and light source

Note: Fluorescent lighting is not included because variations in its quality make general rules impossible to give. See text for details.

DAYLIGHT FILMS

	Electronic flash	Blue flashbulbs	Open shade, cloudy days, marine and distant scenes	3400 K photofloods	3200 K professional studio lamps
Anscochrome	**UV 15**	**no filter needed**	**UV 15**	***Ansco 10 Conversion Filter**	***Ansco 10 Conversion Filter**
Ektachrome E-1	**See special instructions with film**	**no filter needed**	**Skylight 1A**	**§*Photoflood filter for Daylight Type Color Films (80A)**	**not recommended**
Ektachrome E-2	**81A**	**no filter needed**	**Skylight 1A**	**no recommendation available**	**not recommended**
Kodachrome	**81A**	**no filter needed**	**Skylight 1A**	***Photoflood Filter for Daylight Type Color Films (80A)**	***80A plus 82A**
Kodacolor, Ektacolor	**no filter needed**	**no filter needed**	**Skylight 1A**	**no recommendation available**	**not recommended**

*§Not recommended with sheet film EI Ektachrome. *For emergency use only.*

TYPE A FILMS (BALANCED FOR 3400 K PHOTOFLOODS)

	Daylight	3200 K professional studio lamps	Clear wire-filled flashbulbs	SM flashbulbs	SF flashbulbs	M-2 flashbulbs
Kodachrome	**Daylight Filter for Type A Color Films (85)**	**82A**	**81C**	**no filter needed**	**no filter needed**	**81EF**
Kodacolor and Ektacolor	**Daylight Filter for Type A Color Films (85)**	**no recommendation available**	**no filter needed**	**no filter needed**	**no filter needed**	**no filter needed**

TYPE B FILMS (BALANCED FOR 3200 K PROFESSIONAL STUDIO LAMPS)

	Daylight	3400 K photofloods	Clear wire-filled flashbulbs	SM flashbulbs	SF flashbulbs	M-2 flashbulbs
Ektachrome (E-1)	**Daylight Filter for Type B Color Films (85B)**	**81A**	**81C**	**not recommended**	**not recommended**	**not recommended**
Ektacolor	**Daylight Filter for Type B Color Films (85B)**	**81A**	**81EF**	**not recommended**	**not recommended**	**not recommended**

TYPE F FILM (BALANCED FOR CLEAR FLASHBULBS)

	Daylight	3400 K photofloods	3200 K professional studio lamps	SM flashbulbs	SF flashbulbs	M-2 flashbulbs
Ektachrome	**85C**	**82A**	**82C**	**82B**	**82B**	**81**

Abe Cohen's Exchange

Mid-Summer Clearance Sale!

OUT THEY GO! $500,000.00 WORTH OF FLASH CAMERAS, MOVIE CAMERAS AND PROJECTORS, ENLARGERS, PHOTO ACCESSORIES AND BINOCULARS AT CLEARANCE PRICES. RUSH YOUR ORDER TODAY TO ASSURE DELIVERY!

New 35mm Cameras

35mm EXA 2-LENS FLASH OUTFIT

List Price 139.15 **99.50**

- Single Lens Reflex with 50mm Westar F2.8 Coated Lens and 100mm Westar F4.5 Telephoto Lens
- Built-In FX Synchro Flash • Speeds to 1/500
- Focal Plane Shutter • Eveready Carrying Case

35mm PRAKTICA FX REFLEX

List Price 139.50 **79.00**

- Single Lens Reflex with 50mm Tessar F2.8 Preset Lens
- Synchro for Flash or Strobe • Speeds to 1/500
- Focal Plane Shutter • Exact Size Viewer
- Automatic Film Transport and Shutter Cocking

35mm ILOCA QUICK "IIA"

List Price 89.50 **37.95**

- Color Corrected Ilitar F3.5
- Coupled Range & Viewfinder
- Prontor SV-MX Full Synchro Shutter
- Quick Focusing • Speeds 1/25 to 1/200

8.95 Leather Case **4.95** *7.95 Flash Unit* **3.95**

35mm AUTOMATIC PENTACON

List Price 259.50 **149.50**

- Single Lens Reflex with 50mm Westagon F2., Auto. Diaphragm
- Focal Plane Shutter • Speeds to 1/1000
- Synchro for Flash or Strobe • Prism Viewer
- Automatic Film Trans. and Shutter Cocking

15.00 Eveready Carrying Case . . . **10.95**

35mm AUTOMATIC EXAKTA VX

List Price 392.00 **249.00**

- Single Lens Reflex with 58mm F2 Zeiss Biotar Pre-set Lens
- Penta Prism Viewfinder
- Synchro for Flash or Strobe • Speeds to 1/1000
- Waist Level Viewer • Film Trans. & Cocking

12.50 Eveready Case **10.00**

35mm DITTO "99" RAPID SEQUENCE

List Price 99.00 **49.50**

- Full Frame Sequence Camera
- F2.8 Coated Lens • Speeds to 1/1000
- Built-In Flash Synchro (incl. Sequence Strobe)
- Focal Plane Shutter • Interchangeable Lenses

45.00 Tele Lens 105mm, F6.3, W/Frame Viewer . . . **33.50**

8.50 Eveready Carrying Case . . . **6.50**

35.00 Wide Angle Lens 35mm F3.5 . . . **27.50**

35mm CERTO SUPER DOLLINA II

List Price 129.50 **69.50**

- Heligon F2. Coated Lens in Flash Synchro MX Shutter
- Coupled Range & Viewfinder • Speeds to 1/500
- Automatic Film Transport and Shutter Cocking
- Double Exposure Preventer • Focusing Knob

9.95 Eveready Carrying Case . . . **7.50**

35mm KODAK RETINA IA

Specially Priced! **67.50**

- Xenar F2.8 Coated Lens
- Double Exposure Preventer
- Compur MX Flash Shutter • Speeds to 1/500
- Film Lever & Shutter Cocking • Eveready Case

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Save over 40%!

Famous Model K-36

Disc Model

LIFETIME GUARANTEED 8mm KEYSTONE MOVIE CAMERA

List Price 59.95 **34.95**

- F2.8 Coated Lens • 3-Speeds
- Footage Indicator • Drop-In Load
- Self Movie Running Lock
- Brilliant Optical Viewfinder

With F1.9 Lens, List 78.00 - **47.50**

Save 30%!

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LIFETIME GUARANTEED 8mm KEYSTONE PROJECTOR

Orig. List 99.50 **69.95** With Case

- Brilliant 500-Watt Illumination
- F1.6 Coated Lens • Blower Cooled
- 400-Ft. Reel Capacity • AC-DC Motor
- Variable Rheostat Speed Control
- Spring Powered Tilter • Fast Rewind

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50x50—List 21.50 **14.95** 40x40—List 15.95 **8.95** 30x40—List 13.75 **7.95** 37x50—List 19.25 **12.95**

COMPLETE STOCK OF NEW & USED 8 & 16mm MOVIE CAMERAS, PROJECTORS & LENSES!

• Cine Kodak • Bell & Howell • Keystone • DeJur • Revere and Others

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VOIGTLANDER BESSA I

F3.5 Skopar Lens

List Price 94.95 **49.50**

- Speeds to 1/400
- Picture Size 2¼ x 3¼
- Compur Rapid Synchro Shutter

VOIGTLANDER BESSA II

F3.5 Skopar Lens

List Price 124.50 **74.50**

- Speeds to 1/400
- Built-In Range Finder
- Picture Size 2¼ x 3¼
- Compur Rapid Synchro Shutter

CRYSTAR FLEX REFLEX

F3.5 Coated Lens

List Price 57.95 **27.50**

- Built-In Flash Synchro
- Shutter Speeds to 1/200
- Full Size 2¼ x 2¼ Viewer
- Sportsfinder and Magnifier
- Leather Carrying Case

VOIGTLANDER VITO II

Color Skopar F3.5 Lens

List Price 54.50 **34.50**

- Prontor SVS-3X Shutter
- Built-In Flash Synchro
- Speeds to 1/300
- Double Exposure Preventer

Like New!

Leather Case *List 8.50* **6.75**

S. V. E. AUTOMATIC SLIDE PROJECTOR

- 300 Watts • 5" F3.5 Lens • Blower Cooled
- Airequipt Automatic Changer • 2 x 2 35mm

List 74.90 **46.75**

MANSFIELD DELUXE SLIDE PROJECTOR

- 300 Watts • 5" F3.5 Lens • Blower Cooled
- 2 x 2 35mm Slide Carrier • With Carrying Case

List 45.00 **27.95**

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- 300 Watts • 5" F4. Color Corrected Lens
- Airequipt Automatic Changer • Blower Cooled
- 2 x 2 35mm • Complete with Carrying Case

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BRAND NEW IMPORTED PRISM BINOCULARS

Highest Quality "Megaphos" or "Selsi" for All Purposes

6x15 Ind. Focus . . . . **11.95** 8x25 Ind. Focus . . **17.50**
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7x35 Zeiss Type, I.F. **22.50** 7x50 Cent. Focus **34.50**
7x35 B & L Type, C.F. **27.00** 8x30 Cent. Focus **22.50**
8x40 Bausch & Lomb Type C.F. **39.50**

All With Leather Carrying Cases. *Add 10% F. E. Tax

SAVE MORE ON BRAND NEW FEDERAL ENLARGERS!

	LIST	NOW
35mm 135C, F4.5 Lens	49.95	37.49
Model 135C Carrying Case	7.25	5.44
FOR 2¼ x 3¼ NEGATIVES		
No. 240-Diffused F7.9 Lens	24.95	18.75
No. 269-Diffused F6.3 Lens	39.75	30.49
No. 279C-Diffused F6.3 Lens	46.95	35.19
Nos. 269, 279C-Carrying Case	7.25	5.44
No. 269CL-Gold Light, F6.3 Lens	53.00	40.50
No. 315CL-Gold Light, F4.5 Lens	80.00	59.75
FOR 4 x 5 NEGATIVES		
No. 450-Diffused F4.5 Lens	109.50	81.95

COUPLED LENSES FOR LEICAS

	LIST!	SALE!
35mm Angenieux F 2.5 Coated Retro-focus Wide Angle Lens. Like New!	120.00	72.50
35mm Summaron F3.5 Coated Wide Angle Lens. Like New!	96.00	62.50
50mm Elmar F3.5 Lens for M3. Like New!	60.00	84.50
50mm Elmar F3.5 Coated Lens. Like New!	57.00	42.50
50mm Xenon F1.5 Coated Lens. Used!	149.00	84.50
50mm Summarit F1.5 Coated Lens. Like New!	177.00	110.00
85mm Zeiss Sonnar F2. Coated Lens. Used!	179.50	97.50
85mm Summarex F1.5 Coated Lens. Like New!	360.00	199.50
90mm Elmar F4. Coated Lens. Chrome. Like New!	90.00	64.50
135mm Travenar F3.5 Coated Lens. New!	Special!	69.50
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Coated Lenses For Contax Cameras

35mm Zeiss Biogon F2.8. Like New!	283.00	79.50
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Zeiss Tessar Ctd Enlarging Lenses

	Now!		Now!
2" F4.5	36.00	5¼" F4.5	55.00
3" F4.5	36.00	6" F4.5	60.00

Highly Corrected For Precision Work!
Liberal Allowance For Your Trade-In

NEW "ASTRO PANTACHAR" LONG DISTANCE LENSES WITH MOUNT

For Still, Flash or Motion Picture Cameras. Highly Corrected, Needle Sharp Definition. Fitted with Adapters for Cine Leica, Exacta, Contax S, Praktica, Primar Reflex-1 Cameras.

Specify Adapter Desired When Ordering!

125mm F2.3	195.00	300mm F5	185.00
150mm F2.3	275.00	800mm F5	895.00
150mm F1.8	345.00		
400mm F5 with Leica Identoscope			395.00
Hassel-Blad Adapter			**$30.00 Extra**

CARL ZEISS TESSAR COATED LENSES IN COMPUR RAPID SHUTTER

10.5 cm F4.5 Full Synchro	Special! 66.00
10.5 cm F3.5 Full Synchro	Special! 85.00
13.5 cm F4.5 Full Synchro	Special! 90.00
15 cm F4.5 Full Synchro	Special! 99.00
13.5 cm F6.3 X Synchro	Special! 55.00
21 cm F6.3 MX Synchro	Special! 132.00
15 cm F3.5 X Synchro	Special! 165.00

NEW GERMAN "PRIZE" EXPOSURE METER
Direct Reading. With Case **9.95**

NEW "PRIZE" DELUXE EXPOSURE METER
Extremely Sensitive. With Case **14.95**

NEW "KAM-RA" SERVICE BAG
Leather, Russet Glow or Golden Wheat
Size 9½"x7½"x4½". *List 20.00* **8.95**
Size 11¼"x8½"x4½". *List 22.50* **10.95**

NEW GERMAN "WATAMETER" RANGE FINDER
22' to Infinity. *List 6.70* **2.95**

2" F3.5 ENLARGING LENSES
Tricor Coated Lens in Shutter. Originally on 35mm Camera. Like New **4.95**

GERMAN EXCELSIOR POCKET TRIPODS
Brand New! Lightweight, Flat, Compact. Deero Aluminum Inner Tubes, Aluminum Elaxed Outer Tubes. Black Ribbed Permanent Coating.

MODEL 7L-7 SECTIONS *List 10.95*
Closed 9¼", Extended 46" **5.95**

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$200.00 Value—**only $139.50*!** **A Modern Guaranteed Precision Camera** with . . . Rapid Film Transport—Auto. Counter; **Fully Synch. Prontor SV Shutter** for Flash (M), Strobe (X), Delayed action for both (V); **Speeds**—B-1/2-1/500 Sec.; **Steinheil** F/2.8 (45mm); **Telon** F/5.6 (85mm); **Choro, Wide-**Angle F/3.5 (38mm) Lenses; Dble. Exposure Safety; Viewer; Leather Covered Metal Body; **GUARANTEED**. Complete **$139.50*** plus F. E. T. **Outfit #2** (same as above—except Compartment leather **Case** instead of E. R.) **$145.50** plus F. E. T. **Available Accessories: Telenar** F/5.6 (135mm)—**$39.50**; **Luzon** F/2.0 (50mm)—**$59.50**; **Prismatic "Zoom" Viewer** (30mm-135mm)—**$29.50**

A DARKROOM IN A SUITCASE—Ready to Operate—Complete with Lens.....$79.50

BLOW IT UP with the **New, Convenient, PORTABLE "COMPAK" 35.** Contains all Professional Approved **SOLAR** features—Full **Professional size** (exclusively 35mm). Quickly assembled for fine work anywhere . . . home, travel, etc. **A Great Value**—with 4-element **Tessar** Type F/3.5 2" coated Lens; Finest 2 2.5" Dbl. Condensers; Excl. non-actinic 16 x 19" Baseboard; Dustless Neg. Carrier; Takes **Color Filter**; Compact—29 lbs. Complete. **Full 2-year GUARANTEE.** Only **$79.50** Complete. Join the swing to "COMPAK-35"; **Stowaway Convenience**, PLUS **SOLAR Blue-Ribbon Performance.** See your dealer or write . . .

THE NEW SENSATIONAL

DIAFIX 35mm PRINTER $21.00

Prints pocket size photos, 35 mm Strip Film, and Transparencies from your 35 mm negs. (on perforated paper or film) . . . simply, safely, quickly . . . in B & W or color. No special darkroom needed. Precision Engineered. Mask for less than 24x36mm. **EXCELLENT RESULTS—GUARANTEED**—Complete with simple instructions, only **$21.00.**

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Filters for Color

(*Continued from page 77*)

"see" correctly and false colors will result.

Occasionally we are forced to use the wrong kind of light or the wrong kind of film. To help in a situation like this a filter is placed in front of the lens. The purpose of the filter is to adjust the light before it reaches the film, making it the same or reasonably similar to that for which the film is intended.

In addition to this corrective action filters also may be used to change colors from the normal for special or artistic purposes.

Skylight and U.V. Filters

Pictures made in the open shade are illuminated chiefly by the light coming from the blue sky. Skylight and U.V. filters reduce this bluishness, making the picture appear more pleasing and normal. Pictures of distant landscapes, marine scenes, and scenes taken at or from high altitude all have a tendency toward too bluish a rendition.

One of the causes for this bluishness is that in scenes of this nature there is apt to be a lot of scattered and reflected ultraviolet radiation present. The average normal human eye can't detect or see ultraviolet rays. On the other hand, the top or blue-record layer of color film "sees" these rays and translates them into visible blue.

Skylight and U.V. filters remove most of the troublesome ultraviolet. They should be used over the lens whenever making pictures of the type mentioned above, as insurance against blue overcast.

When using the daylight-conversion filter with indoor films no U.V. or Skylight filter is necessary, since these filters are efficient stoppers of ultraviolet.

The use of these filters need not be restricted to the scenes previously described. They may be used at any time additional warmth is needed. The action of Skylight and U.V. filters is not identical. Each should be used with the make of film for which it is recommended. These filters require no increase in exposure.

Conversion Filters

Conversion filters are useful when your camera is loaded with a color film intended for indoor picture making by artificial light and you have to shoot all or part of the roll by daylight, or, on the other hand, when daylight-type color film has to be exposed to some forms of artificial light. (Manufacturers designating films as suitable for artificial light usually refer to light sources like photofloods, 3200 K lamps, and clear flashbulbs. Electronic flash and blue-tinted flashbulbs are also "artificial" light sources, of course, but are considered approximately equivalent to daylight and are for use with daylight-type films.)

Thus if your camera is loaded with film intended for use with artificial light such as photofloods, clear flashlamps, or 3200 K professional studio lamps, and you want to take pictures in daylight, then

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you will have to use one of the orange-yellow or salmon-colored daylight-conversion filters over your lens. On the other hand, if you have daylight film in your camera and you must take pictures by photofloods or 3200 K lamps, then a blue conversion filter is called for.

Some photographers do all their shooting with an artificial-light film, using the daylight-conversion filter for the outdoor shots. For shots by artificial light, the filter is simply removed. This is very convenient since only one type of film need be purchased for both indoor and outdoor picture making. The results outdoors in daylight are good, and there is little or no loss in speed as compared to the companion daylight film without a filter.

On the other hand, the combination of daylight film plus a blue conversion filter when taking pictures under photofloods or 3200 K lamps is only capable of fair results. The blue filters used are rather inefficient. This inefficiency, plus a lack of blue rays in the artificial light used, results in a great loss of speed.

Although the results you get with the combination of artificial-light film and a daylight filter are good, they will not necessarily be identical with those you would get with a daylight film under the same conditions. This is because the daylight-conversion filters don't do a perfect job of "converting" daylight to light of photoflood or 3200 K quality.

In general, the results from the artificial-light films plus the daylight-conversion filter combination will be somewhat warmer than daylight film used under the same conditions. Greens are usually rendered poorer, lacking separation, and the sky tends to go toward the greenish-blue. Artificial-light films are not as contrasty, in general, as are their companion daylight films. Therefore on cloudy days your pictures under some conditions may lack snap and brilliance, and appear rather lifeless.

When artificial-light films plus the daylight-conversion filters are used with blue flashlamps or electronic flash as the sole light source, trouble may result. Blue flashlamps and electronic flash are only rough or imperfect equivalents of daylight. The daylight-conversion filter, as previously mentioned, is only a rough or imperfect converter of daylight to the type of artificial light for which the film is balanced. Marry an imperfect filter to an imperfect light source and the offspring, namely your pictures, will be born imperfect, as far as faithful color reproduction is concerned.

However, blue flashlamps and electronic flash may be used as *fill-in* lighting to illuminate shadows in outdoor photography with good results with a conversion filter on.

In aerial and high-altitude photography, when taking marine scenes, snow pictures, distant landscapes, and at any other time when there is a lot of excess blue light and scattered ultraviolet the artificial-light film plus daylight filter may give slightly better results than unfiltered daylight film. However results on daylight film with a skylight or U.V. filter are usually comparable.

If you are going to use a "correction," polarizing, or some other special-effect filter in conjunction with artificial light film along with a daylight-conversion filter, the results may not be as predictable or as good as when daylight film is used. The polarizer gives rather grayish-blue skies when used in combination with a daylight-conversion filter and artificial-light film.

Combining two or more glass filters may cause a loss of sharpness, and a lowering of contrast, due to internal reflections between the filters. Use coated filters to reduce the danger of this latter condition.

Conversion filters made for use with one brand of color film won't necessarily produce satisfactory or identical results when used on a color film of another manufacturer. The dyes and sensitivity of the individual layers in the films vary from make to make. Also, each manufacturer has his own standard as to what makes a pleasing color picture. Therefore, use the filter recommended by the manufacturer.

Daylight-conversion filters may fade upon prolonged exposure to sunlight. The amount of fading that is dangerous usually cannot be detected visually. If you are a steady and frequent user of this kind of filter, change it for a new one at the beginning of each picture-making season. (Often bewilderment of an experienced photographer over poor results, coupled with a feeling of "losing the old touch" may merely be the result of a conversion filter that has faded imperceptibly.)

Polarizing Filters

The most common use for the polarizing filter in color photography is in darkening a blue sky. Used this way they make clouds, light-colored buildings, blossoms, and other objects stand out against the sky dramatically. The greatest darkening effect takes place when shooting at right angles to the sun. Little or no effect results when shooting directly toward or away from the sun, or on hazy or cloudy days and when the sky isn't blue. (The polarizer is the only means of darkening a blue sky in color photography that will not distort the color of other objects in the scene.)

The polarizing filter increases the color saturation of many outdoor scenes by removing reflections from such objects as grass, leaves, and building roofs. Bluishness also is suppressed since the polarizer tends to remove reflected skylight. (It is also useful in haze reduction and penetration.)

The ability to remove reflections is helpful when photographing through water and glass at an angle. This is useful in marine and commercial photography. All reflections can't be removed, only those coming from the subject at an angle of approximately 35 degrees. Reflections from metallic surfaces are not eliminated by a polarizing filter.

The polarizer is very simple to use. To see what the polarizer will do for you, hold it up to your eye and look at the subject from the same angle as that

of the camera lens. Revolve the filter to the left or right till you see the effect you want. Then place the filter on the lens in the same position.

Polarizing filters are available in a number of special mounts. In one of these a handle tells you when polarizing action is at its maximum. Place the filter in front of the lens and simply rotate it till the handle points toward the sun. In removing reflections from horizontal surfaces, such as water or floors, the handle is placed in the vertical position. To remove reflections from vertical surfaces such as windows the handle is placed in a horizontal position. Viewing filters are supplied by one manufacturer to attach to the handle of his polarizing filter. These permit previewing the scene while the filter is on the lens.

Some of these filters are supplied with engraved scales. One use for the scales is when transferring the filter from the viewing to the taking lens of a twin-lens reflex camera. In one elaborate version the filter can be swung through an arc of 90 degrees so that it can be alternately placed in front of the viewfinder or the taking lens. Provision is made for rotating the filter in its mount.

Polarizing filters require an increase of 3x (1½ stops). This applies regardless of the position of the filter in relation to the subject.

Color-Correction Filters

Color-correction filters are used to make small changes in the color quality of the picture-taking light. Filters of this type usually are very light or pale in color. One of the most common applications of color-correction filters is to adjust the color quality of photoflood lamps, 3200 K lamps, or clear foil-filled flashlamps, to match the color quality to which a particular artificial light color film has been balanced.

Thus let us assume that your camera is loaded with either a photoflood-type color film or a color film balanced for use with 3200 K lamps. You want to take pictures with clear foil-filled flashlamps. The light from these lamps is bluer than that of either photofloods or 3200 K lamps. To filter out the excess blue, you would place a yellowish correction filter over the lens. A yellowish color-correction filter is also required when shooting a color film balanced for use with 3200 K lamps by the light of photofloods. The latter emit a bluer light than do 3200 K lamps.

A bluish color-correction filter is used when shooting a color film balanced for use with photofloods by the light of 3200 K lamps. The light from these lamps is yellower than that of photofloods. A bluish color-correction filter is also used to expose a film balanced for clear foil-filled flashlamps when used either with 3200 K or photoflood lamps. The light from these lamps is yellower than that of clear foil-filled flashlamps.

Color-correction filters are also used to adjust the color quality of incandescent tungsten lamps that are not burning at their rated voltage. When the voltage is too high these lamps will burn bluer than normal. When the voltage is too

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low the light will be redder than normal. Tables telling you which filter will correct a certain voltage deviation for a particular lamp are supplied by each filter manufacturer. A color-temperature meter will also help you determine which filter to use.

After tungsten lamps, especially photofloods, have been in use for quite awhile the light they emit becomes considerably redder than when they were new. Here the use of a color-temperature meter with appropriate filters will help you avoid pictures that are excessively red.

The light from ordinary household incandescent lamps is redder than that of photofloods, 3200 K lamps, or clear flashlamps. If you have to shoot under this type of illumination, such as when making existing-light or location pictures, bluish color-correction filters will help you. Again, a color-temperature meter will help determine just which filter to use. Tables giving this information also are supplied by the makers of the filters.

Color-correction filters also are used with daylight-type color films. A yellowish color-correction filter is sometimes used when taking pictures by bluish daylight, such as pictures in the open shade, marine scenes, or shots on cloudy days. This is done when the results from a skylight or U.V. filter are not strong enough, or if a somewhat different color rendition is desired. This latter is a matter of taste and must be determined by experiment.

When the light is rather reddish or warm, such as that from late-afternoon sunlight (not at sunset when the light is decidedly red), a bluish color-correction filter is sometimes used.

Certain electronic-flash units produce results on daylight color films that are too bluish. A yellowish color-correction filter will usually counteract this effect. Consult the maker of the electronic-flash unit you are using for specific filter information. Also see the special instruction sheets packed with certain color films.

Very long time exposures, or extremely short exposures such as those from certain electronic flash units may cause deviation from normal color rendition. This effect is called "reciprocity failure". (For a simple explanation of reciprocity failure see *Exposure For Color*, POPULAR PHOTOGRAPHY, July, 1955.) Color-correction filters are useful here too. The film maker should be consulted for specific recommendations. Give him the emulsion number and expiration date of the film you have on hand, the length of exposure, and type of light you are going to use.

Color-correction filters are also used with fluorescent light. See following section for details.

Two general types of color-correction filters are supplied. In one type the filters are supplied in gradually increasing steps of bluishness or yellowishness. These are marketed under the name of "Light Balancing Filters," "Color Toning Filters," "Color Balance Filters," and "Light Corrector Discs." Another type of filter called "Color Compensating" is supplied in varying depths of specific additive colors (red, green, and blue) and subtractive colors (cyan, magenta, and yellow). The G-E Variable Color Filter is one interesting new approach to the problem of color filters. By rotating the filter ring you can achieve the effect of several conventional color-correction filters. (See *Two New Tools for Color* in the October, 1954 issue of PHOTOGRAPHY.)

The special application of each of these types of filter is modified by the somewhat varying standards and principles each maker uses. If you have a special problem or want specific recommendations regarding the use of these filters, consult the maker of the filter you wish to employ.

Gelatin color-correction filters sometimes are bound between glass with color slides to correct poor color rendition, or to create a special effect when printing or projecting.

Fluorescent Light

The charts on page 98 contain no recommendations for filters for fluorescent lamps. Fluorescent lamps are a combination of two light sources, a mercury-vapor light and the light from "phosphors" coated on the inside of the tube. The latter are activated by the ultraviolet rays emitted by the mercury vapor.

Any attempt to filter one portion of the light properly will tend to upset the balance of the other portion of the light. In addition, fluorescent tubes of different makes vary widely in the amounts of the various colors of the spectrum they emit, even when they may be visually the same.

The photographer also has no guarantee that tubes of the same type and color are being used together in a given location. In addition, the color of the tubes changes considerably upon aging. It is impossible to measure the light from fluorescent tubes using a color-temperature meter. If you must use fluorescent light try to make sure that all the tubes are of the same make, type, and age. Then consult the film manufacturer for specific data, giving him the emulsion number of the batch of film you are using. If the film manufacturer doesn't have data on the particular lamp you are using then consult the lamp manufacturer.

The chief need for shooting by this kind of light is for commercial photographers on location and for those doing available-light color photography. For the latter, even if perfect filtration were possible the loss of film speed from the filter would usually be prohibitive.

Pictures that have been made by fluorescent light may often be improved if viewed or projected with one or more correction filters mounted with them. The filters needed must be determined by experiment, and are largely a matter of taste.

Filter Factors

Most color-correction filters don't require any change in exposure. However, some of the heavier varieties do absorb enough light to require an increase.

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35mm Ektachrome 20 exp.	5.50	4.70
8mm Kodachrome 25 ft. roll	11.25	9.50
8mm Kodachrome 25 ft. magazine	13.95	11.85
16mm Kodachrome 50 ft. magazine	20.85	17.70
16mm Kodachrome 100 ft. roll	31.20	26.50
620 or 120 Kodacolor	5.94	4.75
620 or 120 Ektachrome	3.75	3.10
828 Kodachrome	5.55	4.75
335 Kodachrome Stereo	13.95	11.85

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Superb Lenses that amaze the experts. Compare with the most expensive lenses made.

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1½" F2.5 TELEPHOTO — Reg. $26.95 — **SALE $17.75**
Focusing mount, click stops, built-in filter holder.

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Fixed focus, click stops, built-in filter holder.

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FOR 16mm MOVIE CAMERAS

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Focusing mount, click stops, built-in filter holder and sunshade.

17mm F2.7 WIDE ANGLE — Reg. $34.95 — **SALE $23.75**
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1" F:0.95 NORMAL — Reg. $175.00 — **SALE $145.00**
Ultra high speed. Standard 16mm "C" mount. Nine elements, Coated. Coated, Color Corrected. Amazing resolving power.

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135mm F4.5 TELEPHOTO — Reg. $75.00 — **SALE $59.50**
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135mm F3.8 TELEPHOTO — Reg. $66.95 — **SALE $49.95**
Arco Tele Colinar. Outstanding optical system. Coated, Color Corrected. High resolving power.

85mm F2.8 TELEPHOTO — Reg. $84.50 — **SALE $59.50**
Steinheil Culminar, Coupled to Rangefinder. Coated, Color Corrected.

85mm F1.5 TELEPHOTO — Reg. $199.50 — **SALE $157.95**
Lithagon, 6 element. Coupled to rangefinder. Click Stops. Coated, Color Corrected.

35mm F4.5 WIDE ANGLE — Reg. $82.50 — **SALE $59.50**
Steinheil Orthostigmat. Coupled to Rangefinder. Coated, Color Corrected.

FOR EXAKTA CAMERAS

Also available for Exa, Praktica, Praktiflex, Pentacon

135mm F4.5 TELEPHOTO — Reg. $60.00 — **SALE $44.75**
Steinheil Culminar, Coated, Color Corrected.

135mm F2.8 TELEPHOTO — Reg. $149.50 — **SALE $119.50**
Steinheil Quinar. Pre-set diaphragm. Coated, Color Corrected.

85mm F2.8 TELEPHOTO — Reg. $65.00 — **SALE $51.95**
Steinheil Culminar, Coated, Color Corrected.

85mm F1.5 TELEPHOTO — Reg. $179.50 — **SALE $145.00**
Lithagon, 6 element. Click Stops. Coated. Color Corrected.

40mm F3.5 WIDE ANGLE — Reg. $49.50 — **SALE $39.95**
Steinheil Cassaron, Coated, Color Corrected.

35mm F4.5 WIDE ANGLE — Reg. $64.45 — **SALE $49.75**
Lithagon. Pre-set diaphragm. Covering power of 64°. Great depth of field. Coated, Color Corrected. Extremely sharp. With case.

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Please do not confuse Ritz Binoculars with low-priced binoculars currently being advertised everywhere. Ritz Binoculars are precision instruments on a par with a famous make selling for $150 to $200.

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LIGHT ALLOY CASTING
HARD-COATED OPTICAL PRISMS
WITH LEATHER CASE AND STRAPS
FULLY GUARANTEED

Size	Angular Field	Weight	SALE PRICE
6x30 C.F.*	7.5°	17.7 oz.	$29.50
8x30 C.F.*	7.5°	17.7 oz.	39.75
7x35 C.F.*	7.0°	17.7 oz.	34.75
7x50 C.F.*	7.1°	35.5 oz.	39.75
15x60 C.F.*	4.0°	47.6 oz.	64.75
7x35 I.F.* Wide Angle	11.0°	30.0 oz.	54.75

* Note: CF—Central Focus. I.F.—Individual Focus.

FOR ARGUS C-3 AND OTHER 35mm CAMERAS
Contessa, Contaflex, Bolsey, Argus C-4, Signet, Retina, Voigtlander.
SALE Reg. $29.50 **$16.95** each
Auxiliary Lens TELEPHOTO or WIDE ANGLE
Complete with Viewfinder. Coated, Color Corrected.

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ANSCO 35MM COLOR RELOADS
Now—at LOWEST PRICE ANYWHERE!
Made from factory-fresh brand new ANSCO Film. Money back if not fully satisfied. Daylight or Tungsten. **REAL BIG SAVINGS.**
☐ 20 exp. for $1.00 ☐ 5 for $4.50

New High Speed ANSCOCHROME FILM
☐ 20 exp. $1.50 ☐ 5 for $6.95

☐ **FREE COLOR ENLARGEMENT . . .**
. . . with every roll of color film processed at these LOW RATES: Ansco film $1.00 . . . Ektachrome 120 and 620—$1.00 . . . Ektachrome 35mm—$1.25 (mounted) . . . Custom processed by experts. You get a FREE coupon good for 2¼" x 3¼" full color enlargement with every roll ordered!

WALLET SIZE COLOR PRINTS ONLY 35¢ EA.
Now you can get quality full wallet size 2¼" x 3¼" color prints from your 35mm color transparencies at this low price. Wonderful full vivid color prints you'll be proud to show to your friends.
☐ AT JUST 35¢ EACH!

New! KODAK TRI-X
SUPER SPEED B & W FILM
35MM RELOADS AT BIG SAVINGS
This new fast film is twice as fast as Super XX. It offers new exciting picture-taking possibilities. Take indoor shots by existing light . . . night sporting events without a flash . . . fast, action pictures even on dull days. ASA daylight exposure rating better than 200. Reloaded from original 100 ft. Kodak factory-fresh packed film. FULLY GUARANTEED.
You can't buy fresher film anywhere.
☐ 36 exp. rolls 69¢ ☐ 20 exp. rolls 49¢
☐ 5 rolls $3.00 ☐ 5 rolls $2.00
☐ Plus X ☐ Super XX available same price
☐ TRI-X also available in 120 & 620 size—90¢ a roll

HEADQUARTERS FOR NEWEST TYPE FOREIGN FILMS

FROM GERMANY . . . ADOX FILM
designed for your 35mm camera
☐ ADOX KB-14 (ASA 16 Daylight) Medium Speed
☐ ADOX KB-17 (ASA 32 Daylight) High Speed
☐ ADOX KB-21 (ASA 80 Daylight) Super Speed
☐ 36 exposure cartridge $1.49
☐ Also in 50 FOOT ROLLS—ONLY $5.85

FROM ENGLAND . . .
FAMOUS 35MM ILFORD FILM
☐ 35MM HP-3—36 exp. ONLY $1.28—3 for $3.50
☐ 27 ft. 35mm rolls $2.70
☐ 100 ft. 35mm rolls 40
☐ 120 & 620 (8 exp.) per roll . . . . . $ .50

35MM BLACK & WHITE SLIDES
The most thrilling way to look at your pictures is on the screen. Now all your friends can see your pictures at the same time. Slides made from any size negative or photo. Specify cardboard mounts or film strips.
☐ 8¢ per frame from complete 35mm roll unmounted
☐ 10¢ mounted ☐ 40¢ from photos
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NEW FAST EKTACHROME TOP QUALITY RELOADS
NOW you can get the new FAST Kodak Ektachrome color film at SENSATIONAL LOW PRICES in Factory Fresh fully guaranteed reloads. Made especially for 35mm cameras this new fast color film enables you to take clear crisp color shots with the speed of black and white! ASA 32 Daylight—16 Flash or Tungsten. 100% Satisfaction guaranteed.
☐ 20 exp. . . $1.50 ☐ 36 exp. . . $2.50
☐ 5 for $6.95 ☐ 4 for $9.50
YOU SAVE 55¢ YOU SAVE 50¢

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EKTACHROME PROCESSING
Just think—top quality processing and mounting of your new Kodak Ektachrome film and FREE ENLARGEMENT coupons at these low prices:
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These prices include mounting your transparencies (35mm only) in handy cardboard mounts!
FREE One color enlargement free with each 20 exp. roll
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Since there are over 100 filters available and several types of color film a table giving all the filter factors would be too large for this article. Consult the filter manufacturer's instruction to learn how much exposure increase, if any, to give with the particular filter-film-light combination you are using.

General Remarks

Filters should be treated with the same respect as a good lens. They should be cleaned with lens tissue and lens-cleaning fluid in the same manner as a lens. When not in use keep them in the cases or pouches they are sold in away from damp, excess heat, and light.

Good filters should fit the adapter rings for which they are made without looseness or rattling. If the filter is somewhat thicker than the adapter ring, don't screw the insert ring or lens hood down on it, using a great deal of pressure. Internal strains may develop affecting picture sharpness.

Never make visual comparisons between two filters that are supposed to do the same job. The visual appearance may have nothing to do with the photographic effect each filter may have.

Filters are inexpensive. Don't buy "bargain" filters or those from the second-hand heap unless you like to experiment with little guarantee of success.

Filters for color photography are available as dyed gelatin sheets, dyed gelatin, or other material laminated or cemented between two pieces of optical glass, and solid dyed-in-the-mass optical glass. (However, there aren't many filters for color shooting that are available as solid optical glass because of the difficulty in coloring this material to the exact hue and shade needed at reasonable cost.)

Gelatin filters may easily be dyed to many hues and shades. They cost very little and are therefore excellent for experimental or occasional work. Gelatin filters should be handled with great care. They scratch easily, melt on exposure to too much heat, and are attacked by moisture. (Some varieties are lacquered and can be cleaned with a damp, soft cloth, but should still not be exposed to excessive moisture.) When two or more filters are to be used in combination, the thin gelatin types disturb focus and image quality less than do glass-mounted ones.

To attach gelatin filters to your lens you must purchase a filter-frame holder. The size that takes 2-inch-square gelatins fits any series VI adapter ring, the one for 3-inch gelatins fits series VIII. Gelatin filter frames which fit the filter-frame holders let you manipulate the filters with less danger from scratch and fingermarking.

Laminated filters may be dyed to all the colors available in gelatin. However they are far more durable. In some filters of this type gelatin is cemented between two sheets of optical glass, in others the cement or laminating material carries the dye.

Laminated filters may separate on exposure to extreme heat and if dropped. Don't attempt to reassemble a separated filter yourself—unless you don't mind pictures that aren't critically sharp.

The organic dyes in gelatin and laminated filters may fade if exposed to strong daylight for great lengths of time. If you use a filter a great deal, especially in sunlight, then replace it frequently. Filter manufacturers will be glad to advise you of the stability and life of the filters they make. If in doubt, a new filter is very inexpensive as compared to the cost of film and the care, time, and creativeness that go into the making of a picture.—▶

Facts About the Cameras

(*Continued from page* 63)

Cameras with coupled rangefinders. (4) Single-lens reflex cameras with waist-level groundglass focusing and framing. (5) Single-lens reflex cameras with eye-level groundglass focusing by means of a prism or an additional mirror. (6) Twin-lens reflex cameras with focusing and framing by means of a separate viewing-lens system with a groundglass.

Let us talk a little about each type:

Box-type: Not very much can be said in favor of the 35-mm box camera, which is hardly ever seen in this country but is fairly popular in Europe. As Ansel Adams once wrote, "A second-rate miniature camera is an abomination."

Simplified: Simple cameras with distance scale focusing vary tremendously in quality. Those with good mechanical construction are adequate performers when in the hands of photographers who are willing to compensate for their cameras' inherent limitations by taking extra care in setting the distance scale, and who have learned to exploit the lens' depth-of-field characteristics. Learning to estimate distances fairly accurately is a valuable asset, but an accessory rangefinder, which in many cases may be clipped into the camera's accessory shoe, is an ace up your sleeve.

Rangefinder-type: The two varieties of coupled-rangefinder cameras, split-level and superimposed-image types, have their adherents. The proponents of the split-field rangefinder argue that this type of instrument is theoretically more accurate. Advocates of the superimposed type reply that their rangefinders are faster and easier to use, particularly in dim light or where there are no sharp verticals for the split-field rangefinder to split.

One thing that does increase rangefinder accuracy and efficiency is magnification of the rangefinder image. This is the main case for separation of the rangefinder and viewfinder systems because in the combined rangefinder-viewfinder it is obvious that the rangefinder image patch in the center of the field must have the same magnification or reduction as the entire viewfinder system. People who prefer the combined rangefinder and viewfinder will tell you that they don't like losing sight of the whole picture in order to jump over to the rangefinder window and that because the rangefinder image patch is always

BROOKS

West's Largest Selection—Budget Terms Available

NEW 1955 TRADE-UPS

LEICA IIIF .... **$49.95** plus your old LEICA IIIF (red dial)
ROLLEIFLEX 1955, **$77.50** plus your old Rolleiflex MX,
ROLLEICORD V, **$49.25** plus your old Rolleicord IV
MINOX IIIS .... **$48.50** plus your old Minox III
Fully Synchronized CONTAX IIA & IIIA **$69.00**
IIA for IIA or IIIA for IIIA
EXAKTA VX .... **$43.50** plus your old EXTKTA VX
RETINA IIIC .... **$80.50** plus your old RETINA IIA
NIKON S-2 .... **$97.50** plus your old NIKON S

NEW—DISCONTINUED 1954 MODELS

	Reg.	NOW
New VX Exakta w/f/2.8 Preset Tessar		$169.00
New VX Exakta with f/3.5 Tessar lens		149.00
Praktica FX f/1.9 preset Primoplan	$159.50	$ 79.95
Flexaret Synch. f/3.5	99.50	48.95
Ditto Camera f/3.5	99.50	48.00
Ditto Case	8.95	5.95
105mm Ditto Telephoto	39.50	29.95
Bolsey B2 f/3.2 lens	56.50	39.95
Bolsey B22 Setamatic f/3.2 lens	69.50	44.95
Bolsey C reflex f/3.2 lens	89.50	48.50
Contax IIA f/2 X. synch.	336.00	228.00
Contax IIIA f/1.5 X. synch.	412.00	298.00
Super Ikonta A f/3.5 Tessar X. synch.	99.00	69.00
Super Ikonta B f/2.8 Tessar X. synch.	139.00	99.00
Nikon 1954 model, w/f/1.4 Nikkor	299.50	189.00
Exakta penta prism w/f	85.00	38.95
Robot Star f/1.9 lens	249.00	99.00

Many others—write for complete list.

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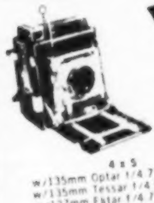


1955 SPEED GRAPHIC

Brand new features of the 1955 Speed Graphic include Graphic coupled rangefinder with built-in Rangelite and automatic parallax-correcting optical viewfinder.

4 x 5	Crown Graphic	Speed Graphic
w/135mm Optar f/4.7 MX 1/400	287.45	331.45
w/135mm Tessar f/4.5, MX	245.00	289.00
w/127mm Ektar f/4.7 MX	269.45	313.45
w/150mm Tessar, f/3.5, Sync	295.00	339.00
w/150mm Xenar f/4.5 MX 1/400	249.50	294.50
w/152mm Ektar f/4.5 X sync 1/200	293.45	347.45
4 x 5 w 135mm Xenar f 4.7 MX 1/400 Kalart R F	$209.95	$249.50

BRAND NEW PRESS CAMERA ACCESSORIES

	Regular	Special
4 x 5 Lisco Holders	4.25	2.99
23 Roll Film Holder for 2¼ x 3¼	21.75	17.20
23 Grafmatic Film Holder for 2¼ x 3¼	17.95	14.40
23 or 22 Roll Holder for 4 x 5	23.95	19.20
45 Grafmatic Film Holder for 4 x 5	24.95	19.95
Graflarger Stand	19.95	16.95
2¼ x 3¼ w 105mm Color Scopar f 3.5 Kalart R F w 1/400 of sec. MX sync	$199.50	$229.50
w/101mm Ektar f 4.5 MX 1/800	297.55	336.05
w/105mm Tessar, f 3.5, MX	245.00	289.00
w/101 Optar f/4.5 MX 1/400	279.85	318.35

BROOKS 1st for Leica

TRADE UP TO A LEICA M3

Leica M3 with Summarit f/1.5	$468.00
Leica M3 with Summicron f/2 lens	447.00
Leica M3 with f/3.5 Elmar lens	348.00
Leica M-3 Body	288.00
Leica IF body, built-in flash	64.80
Leica IIF body, built-in flash	120.00
Leica IIIF body, built-in flash	180.00
Leica IIF with f3.5 Elmar	177.00
Leica IIIF with f/2 Summicron	336.00

	M-3	Standard
35mm Summaron f/3.5	$ 99.00	$ 96.00
50mm Elmar, ctd. f/3.5	60.00	57.00
50mm Summarit, f1.5	180.00	177.00
50mm Summicron f2	159.00	156.00
85mm Summarex, f/1.5, Chrome		360.00
90mm Elmar f/4, Chrome	93.00	90.00
90mm Elmar f/4, Chrome, Collaps. mt.	150.00	
125mm Hektor, f/2.5		147.00
135mm Hektor, Chrm., f/4.5	141.00	135.00
135mm Hektor sht. mtd.	121.50	120.00
Leica Meter	30.00	17.90
Omnica case		60.00
200mm Telyt f/4.5		156.00
400mm Telyt, f/5		450.00
Leica reflex housing		102.00
300mm Kilar, f/5.6		149.95
400mm Kilar, f/5.6		239.95
Leica Flash Gun		24.00
Leica Chico flashgun	19.50	18.00
Stereo Outfit for Leica	207.00	204.00
Omnica case for	60.00	60.00

CONTAX D

Contax D w/f/2.8 preset Tessar **$94.95**
Contax D w/f/2 preset Zeiss **$124.95**
Eveready case .... **$ 12.00**
Praktica FX f/1.9 preset Meyer **$78.95**
Praktica FX f/2.8 preset Tessar **$78.95**
Case **8.95**

BOLEX H-16 LEADER

Tri Focal Viewfinder, turret head for 3 lenses, 25mm f/1.9 Lytar ctd. lens $269.50
Bolex H-16 Supreme camera f/1.9 .... $394.00
NEW BOLEX PAN CINOR ZOOM LENS for 8mm cameras, 12.5 to 36mm, f/2.8, C mount, focusing down to 2½", cpld vf $219.50
BOLEX 16mm Zoom lens, from 20-60mm f/2.8 .... $349.50
Model 70—17.5mm—70mm $449.50
Model 100—25mm—100mm $449.50
Bolex motor .... $ 77.50
16mm W.A. f/1.8 Switar 99.50

16MM SPECIALTIES

New Zoomar 16 lens, 1 to 3-in. f/2.8 .... $800.00
New B & H Anamorphic lens for wide screen movies $598.00
New B & H 70H f/1.9 .... $625.00
New 400 ft. magazine for above $162.50
New Motor for above, 8 to 64 frames $142.00
Bell & Howell 1 in. .095 lens "C" mount $209.50
Bell & Howell 10mm W.A. f/1.8 "C" mount $124.50

NEW ARRIFLEX 16

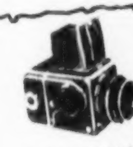
The only 16mm camera providing through-the-lens focusing and viewing during exposure, electric motor drive. Matte box, cables **$1650.00**

16mm Xenon f/1.9 lens **$170.00**
25mm Xenon f/1.5 lens.. **170.00**
75mm Xenon f/2 lens **200.00**
Zoom Lens 1" to 3" f/2.8 for Arriflex **$79.00**

NEW 1955 EXAKTA VX

One of the world's great 35mm single lens reflex cameras ... versatile, accurate, simple to use ... ground glass focusing gives you the exact picture you see.

EXAKTA VX with waist level finder.
Exakta VX w/f/1.9 Schneider Xenon fully auto lens $351.70
Exakta VX w f/2 Westagon, fully automatic $289.50
Exakta VX w/f/2.8 Westanar fully auto lens $239.50
Exakta VX w/auto Biotar f/2 .... $357.00
Exakta VX w/auto f/2.8 Tessar $279.50



SWEDISH HASSELBLAD 1000F

2¼" x 2¼" single lens Reflex Camera, interchangeable roll film magazines, automatic shutter setting, parallex-compensating sportsfinder with built-in contacts $379.50

New extreme wide angle Hasselblad w/38mm Biogon f/4.5 .... $489.50
Finder 40.50
Hasselblad Bellows for close-up work $115.00

Lenses:
135mm Ektar lens f/3.5 .... $285.00
250mm Sonnar f/5.6 $299.50
250mm Sonnar f/4 .... $389.00
Zeiss W.A. Distagon f/5.6, with case $189.50

BROOKS 1st for Linhof

Linhof 2¼ x 3¼ Camera — Complete 3 Lens Outfit

Super Technika 2¼ x 3¼ Camera, 65 f/6.8 W. A. Angulon Lens, 105mm f/3.5 Schneider Xenar Normal Lens, 180mm f/5.5 Tele-Xenar Telephoto Lens. All in full synch. Compur Rapid Shutter to 1/500 sec. All lenses coupled to rangefinder **$569.90**
Same as above, with 105mm f/2.8 Xenotar, W. A. and Telephoto **$663.70**

LINHOF 4 x 5 SUPER TECHNIKA

Multifocus Rangefinder — Tilting and Swinging Back — Revolving Back — Triple Extension Bed — Drop Bed — All Lenses Coupled to Rangefinder — And **NOW NEW UNIVERSAL BACK** and Ektalite Screen. (Accepts Polaroid, Grafmatic, and Roll Film Holders).

4 x 5 LINHOF OUTFITS — Price below; includes camera with lenses (✔). With **full synch. MX Shutters up to 1/500 sec. Coated** — Other combinations on request.

4 x 5	135mm f/3.8 Press Xenar	150mm f/4.5 Xenar	150mm f/2.8 Xenotar	90mm f/6.8 Angulon	240mm f/5.5 Tele Xenar	Price
One lens Outfits	✔					$429.70
		✔				$419.70
			✔			$629.25
				✔		$515.15
Two lens Outfits	✔			✔		$505.15
		✔		✔		$714.70
			✔	✔		$635.60
Three lens Outfits	✔			✔	✔	$635.60
		✔		✔	✔	$845.15
			✔	✔	✔	

CARL ZEISS TESSAR LENSES

105mm f/4.5 MX	$ 66.00
105mm f/3.5 MX	85.00
135mm f/4.5 MX	90.00
150mm f/3.5 X-sync	150.00
150mm f/4.5 MX	99.00

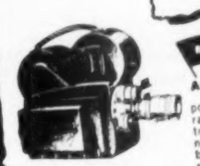
APO LANTHAR LENSES

105mm Lanthar MX f/4.5	$ 90.00
150mm Lanthar MX f/4.5	120.00
210mm Lanthar X shutter	175.00

Schneider Lenses:

65mm W.A. for 2¼ x 3¼ MX f/6.8	$ 64.95
90mm W.A. for 4 x 5 MX f/6.8	74.95
120mm for 5 x 7 MX f/8	99.95
105mm Xenotar f/2.8	169.50
127mm f/4.7 Xenar MX sync.	64.95
135mm f/3.8 Xenar MX sync.	99.95
150mm f/4.5 Xenar MX sync.	89.95
150mm f/2.8 Xenotar	299.50

Prices subject to change without notice.



16mm CINE-VOICE

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AURICON CINE-VOICE

popular-priced 16mm camera that photographs a sound track, perfectly lip synchronized with the picture — to be played on any 16mm sound projector. Single-lens model **$695.00**
Turret model for 3 lenses **$784.50**

AURICON PRO-600

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hovering in the center of their viewfinder they are constantly aware of any focusing error caused by subject or camera movement. Personally, our vote goes for the combined rangefinder and viewfinder, but there are plenty of people who'd give us an argument on this.

Whichever system you prefer, two things are very important. They are the brightness and the contrast of your rangefinder images. In some cases contrast is obtained at the expense of brightness, and vice versa. Before you decide on a rangefinder miniature try the rangefinder out in very dim, flat light. If you can focus under these poor conditions you probably won't experience difficulty under normal shooting conditions.

Single-lens reflex: In the 35-mm single-lens-reflex field the preference seems to be rather overwhelmingly in favor of the eye-level prism type and most of the waist-level-type cameras now provide accessory interchangeable prism finders. Incidentally, in addition to being right side up, the prism image is also correct left-to-right unlike mirror-reflex systems which are always reversed left-to-right. When these cameras experienced their first enthusiastic post-war welcome many photographers became disenchanted because of the delay caused by having to stop down the diaphragm after focusing at full aperture. The first answer from the single-lens-reflex industry was the so-called "preset" diaphragm. With this device you set a stopping device at the *f*-stop you intend to shoot at and then rapidly turn the diaphragm ring without looking until it stops at your preselected aperture. This was a good thought, but even though the presetting mechanism could be operated without removing one's eye from the viewfinder window, there still was a small time lapse between focusing and shooting. The best answer to date came in 1954 when a number of European camera and lens manufacturers brought out fully automatic diaphragms. These are spring-loaded devices that always remain at full aperture. When you're ready to shoot you press down on an appendage of the lens mount which is positioned directly over the shutter-release button (or is in some other manner coupled to the shutter-release button). The act of pressing this device down forces the diaphragm to close down to any *f*-stop you have previously selected and then trips the shutter. As you release pressure after the exposure the diaphragm springs right back to full aperture.

Probably the liveliest debate between 35-mm aficionados concerns the relative merits of the coupled rangefinder versus the eye-level prism. Both systems offer inherent advantages. The single-lens reflex focuses by means of the actual taking lens, thus eliminating any possibility of parallax error, and making accessory viewfinders unnecessary, when using interchangeable lenses. The coupled rangefinder is much faster, particularly in dim light, and if adjusted accurately is superior to the human eye

One of the first pictures made with a miniature camera was of Ernst Leitz by Oskar Barnack, the man who conceived the idea of a 35-mm camera.

in being able to discriminate between what is and what is not really sharp. The reason for this is that the average human eye can resolve points down to only .004 inches or thereabouts. But a camera lens can do much better than this and between the point where the eye hits .004 inches going into focus and .004 inches going out of focus there lies an optical limbo in which the eye cannot discriminate.

Although we hate to jump in where angels fear to tread, this is how we look at this question. When both camera types are approximately equal optically and mechanically they will perform approximately as well in the hands of photographers who know how to use them skillfully. However, both have significant advantages that must be considered in the light of the type of work that the photographer does or plans to do. For general photography of people and events where you are shooting candidly and hurriedly, the more rapid focusing of the coupled-rangefinder camera (especially when rangefinder and viewfinder are united in the same eyepiece) make this style of camera design somewhat preferable in our view. The no-parallax advantage of the prism reflex type, on the other hand, makes this camera design highly prized in all sorts of scientific photomacrography and photomicrography. In addition, the prism cameras perform to significantly great advantage when used with lenses of 135 mm and longer in comparison with coupled-rangefinder cameras. As a matter of fact, none of the interchangeable-lens coupled-rangefinder cameras provide rangefinder coupling for any focal length longer than 135 mm. When such longer focal lengths are used on coupled-rangefinder cameras the rangefinder takes a back seat and an intermediate

these focal-plane shutters were used with Class M bulbs only a portion of the

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takes a back seat and an intermediate reflex housing is inserted between the lens and the camera for focusing and framing. This, in effect, converts the rangefinder miniature into a single-lens reflex camera.

Now, let's discuss shutters.

Shutters for 35-mm cameras are of three distinct types: focal-plane; between-the-lens; and behind-the-lens.

Focal-plane shutters are, of course, not really in the focal plane but a hair's breadth in front of it. They consist of two separate curtains usually made of some sort of high-quality rubberized cloth, but sometimes flexible metal or interlocking metal strips are used. When you set a focal-plane shutter at a high speed, say 1/50 second, the first curtain starts to move across the film gate followed after a very small time interval by the second slit. The width of the slit governs the time interval. Almost all focal-plane shutters travel at one speed and obtain various shutter speeds by varying the slit width. Thus, if you set the shutter at 1/100 second the slit would be half as wide as it was at 1/50 second, but the rate of travel is the same. Below 1/25 or 1/30, depending upon the make or model involved, a delay mechanism comes into action allowing the first curtain to completely open the film gate for the required shutter speed before the second curtain is permitted to rush across and end the exposure. When the second curtain reaches the end of its travel it collides with the first curtain and a delicate spring mechanism locks the two curtains together so that they may be rewound simultaneously without fogging the film. Such shutters are called *self-capping.*

The advantages of the self-capping focal-plane shutter are: (1) Because they are located directly in front of the film gate they offer the maximum opportunity for lens interchangeability and almost all of the top-bracket interchangeable-lens cameras employ the focal-plane shutter. (2) Focal-plane shutters offer the highest shutter speeds because they are achieved by decreased slit width rather than by increased rate of travel. Fastest focal-plane shutter of any 35-mm miniature is that of the Contax, which goes to 1/1250 second, and 1/1000 is fairly common. (3) All things being equal, the focal-plane shutter is capable of more-even exposures over the entire negative area than any other type now in general use.

Disadvantages of the focal-plane shutter are: (1) Under certain conditions, objects crossing straight in front of the lens in the direction of the shutter tend to be elongated while objects going in the opposite direction tend to be compressed. (2) Because the focal-plane shutter is not completely open at high shutter speeds it is less versatile with flash and speedlight. Up until very recently the slit travel on most focal-plane shutters in the 35-mm field was about 24 or 25 milliseconds. (A millisecond is 1/1000 second.) But the peak duration of the average Class M flashbulb is only about 17 milliseconds. Therefore, if these focal-plane shutters were used with Class M bulbs only a portion of the negative would receive full benefit from the flashbulb since it would have died some 7 milliseconds before the slit exposed the final negative area before closing. With these shutters it is necessary to use Class F, long-peak flashbulbs which last long enough for the entire slit journey. Synchronizing electronic flash is also disadvantageous with these shutters. Because the duration of popular electronic-flash units varies from about 1/500 to 1/5000 second it is obvious that the shutter must be fully open at the instant of the flash if the exposure is to be uniform. This means picking the highest shutter speed at which the camera is fully open. Until recently this has meant either 1/25 or 1/30 second. In a dark room or at night this is no great disadvantage because the speedlight flash duration determines the exposure time and the action-stopping power of the shutter. However, where there is some light present you run the risk of getting a ghost image after the flash has popped. Out-of-doors in bright sunlight such cameras will double-expose if synchro-sunlight techniques are attempted.

The second shutter type found on 35-mm miniatures today is the between-the-lens type consisting of three or more blades placed in the optical center of the lens just ahead of the diaphragm. These shutters are designed to open completely in a very short period of time, remain open for the required exposure interval, and then rapidly close. Biggest drawback of this shutter type is that it opens, exposing the middle of the negative first, and closes last over the same area. Thus the edges and corners can never get 100 percent as much exposure as the center of the negative. In actual practice, however, the very small area of 35-mm negatives and the high efficiency of most of the better between-the-lens shutters make this peripheral loss of density highly academic. Between-the-lens shutters cramp the camera designer's style when it comes to lens interchangeability and only one camera with true interchangeability (the Voigtlander Prominent) has ever been built around the between-the-lens shutter.

Between-the-lens shutters are not capable of achieving the high shutter speeds of focal-plane miniatures. The fastest between-the-lens shutters on 35-mm miniatures run to 1/500 second. (*One unique between-the-lens shutter, the Kodak Synchro 800, is capable of 1/800 second but this rotating-blade type of shutter has thus far been confined to 2¼x2¼ and 2¼x3¼ cameras.*) They are, however, outstanding performers with flash and speedlight. Almost all of the between-the-lens shutters today permit Class M *and* Class X (electronic-flash) synchronization at all shutter speeds.

The third type of shutter frequently found on miniature cameras is the behind-the-lens shutter which is so designated because it is mounted at quite a distance from the film gate or focal plane. The farther away these shutters are, the less efficient they are, particu-

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larly at high shutter speeds. Usually consisting of several metal blades they

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larly at high shutter speeds. Usually consisting of several metal blades they rarely exceed 1/300 second in maximum speed. Flash and speedlight synchronization varies from model to model.

Modern 35-mm miniatures come in two basic body styles. The majority are long, narrow, rigid boxes with all, or most of their controls on top. But there is a sizable minority of folding cameras having a bellows between the lens and the body. From the point of hard usage—especially professional use—there is little doubt that the rigid box is superior. But for the man who wants to travel light these folding miniatures offer maximum compactness and minimum weight. Some wonderful cameras with high-grade optics and top-notch between-the-lens shutters and coupled rangefinders are available in this folding style.—*Ralph Carroll.*

35-mm Processing

(Continued from page 89)

yourself. Once mastered, you will be able to make an intelligent choice of the special-purpose films you'll need for special types of subject matter or lighting conditions—as well as developers that best serve these special purposes.

By and large, the problems involved in the exposure and development of 35-mm black-and-white films are about the same as those met in handling larger-size films, only more so. The reason, paradoxically, is that the 35-mm negative is like any other black-and-white negative, only less so.

To make an 8x10-inch print from the little 24x36-mm negative means stretching it some seven and a half diameters. The same print size from a 2¼x2¼ roll-film negative requires only a four-diameter magnification. If the enlargement made from the 35-mm negative is to match the grain and sharpness of the 2¼x2¼ negative it has to be almost twice as good in these respects. Good 35-mm exposure and development technique can and does produce results closely comparable to those attained by equally skillful treatment of 2¼x2¼ negatives when moderate enlargements up to approximately 11x14 are made.

In exposure and development, we strive for either of two major goals: to get the best possible image quality, or the maximum effective film speed from our film-and-developer combination. Outdoors and in other well illuminated situations, film speed is relatively unimportant, and we should strive for the finest possible grain structure plus a long scale of tone gradations in the negative. In poorly illuminated "available light" situations, effective film speed is very important and we must accept some increase in graininess and decrease in gradation scale.

The basic rule of exposure and development can be simply stated: *Exposure does proportionately more for the shadows than it does for the highlights and development does proportionately more for the highlights than it does for the shadows.* From this, it readily can be seen that with any given film-and-developer combination the easiest way to reduce negative contrast is to increase exposure and decrease development. Contrast can similarly be increased if we reduce exposure and increase development.

Our first problem is to select the film-and-developer combination best suited to our purpose. Beginners are well advised to select one film and one developer suited to their particular shooting methods and quality requirements and to stick exclusively to this combination until they have explored thoroughly all of its advantages and disadvantages over a long period of time. Once you've really mastered your original film-and-developer combination, or have tried it long enough to be sure it just isn't your cup of tea, it's time to try other combinations to obtain the desired negative qualities.

The chart listing black-and-white films for 35-mm cameras on page 65 indicates three basic types of panchromatic negative materials for general-purpose photography. In the first group we have ultra-fine-grain, maximum-resolution films which have very modest exposure indexes and some tendency toward high contrast. The second group of medium-fine-grain films are somewhat faster and have more-gentle contrast characteristics. The third group of moderately-fine-grain films are the fast emulsions best suited to available-light photography and other applications where their low-contrast characteristics can be appreciated.

In the article on Adox films in the May issue of POPULAR PHOTOGRAPHY we outlined the basic principles involved in squeezing the maximum resolution, gradation, and fine grain from these 35-mm thin-emulsion films. These maximum-quality films have emulsion layers considerably thinner than those found on normal and super-fast films, which greatly reduces the loss in image resolution caused by irradiation during exposure. Their chief defect, assuming that their slow speeds are no disadvantage, is their lack of exposure and development latitude. Films in the second medium-speed group can frequently withstand as much as three full stops over- or underexposure and still come through with a creditable negative, but the thin Group 1 films cannot, and an error of one stop in either direction can seriously reduce their high-resolution characteristics and result in poor negative gradation. The Ilford film, Pan-F, should be treated approximately in the same way as Adox KB-14, although Pan-F does tend to be slightly more contrasty. Adox KB-17 offers a happy compromise between the ultra-fine-grain and medium-fine-grain approach.

For maximum resolution and gradation, thin films should not be processed in developers which have a solvent action, dissolving the periphery of the silver-grain clumps as they are developed. This creates a pseudo fine-grain effect by increasing the space between adjacent grain clumps in the emulsion and seriously impairs the film's ability to resolve fine de-

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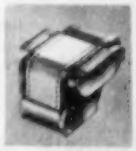

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tail. Some of the developers suitable for use with thin films are Neodyn Blue and Neodyn Red, Kodak D-76, May & Baker Promicrol, Clayton P-60, Edwal Minicol, FR Super X-33, and Kodak Microdol. Because the last three developers do have a slight solvent action they should be used only with the high-contrast KB-14 and Pan-F emulsions. In this case, the slightly flat developers and the contrasty films team up to produce medium-contrast negatives with excellent gradation, grain, and resolution characteristics.

Approximate times and temperatures for the development of thin films will be found in the chart on page 90. These recommendations are meant as a starting point for your own experience and most workers will eventually modify these times to some extent in accordance with their own private notions about negative quality.

The second film group of medium-fine-grain, medium-speed emulsions possesses excellent latitude and gradation, and the beginner should choose one of these as his first "all-around" film. Kodak's versatile Plus-X, for example, can be used as both a maximum quality and an available-light emulsion. In broad daylight it works wonderfully well at ASA exposure indexes between 50 and 100 with fine-grain development. In available-light work, it can be safely employed at speeds up to approximately ASA 320 with development in Promicrol or Microphen, or at 160 ASA with Kodak D-23 developer. Consult the Group 2 chart of developers frequently used in 35-mm practice for specific recommendations (page 90).

In the ultra-fast-emulsion category we have the films with manufacturers' speed ratings from 100 to 200 ASA. These films are all moderately grainy and have somewhat less contrast than the slower films in the first and second groupings. The 100 ASA films like Ansco Ultra-Speed Pan are particularly well suited to flash photography, especially when processed in a soft-working fine-grain or medium-fine-grain developer. Good flash developers are Edwal Minicol and Kodak Microdol and D-23.

The film-speed index you choose to employ with any film depends very largely upon the development you give. Available-light film development has passed through three distinct historical eras. In the first, normal processing was given, necessitating very long camera exposures. The grain was therefore equal to that of films exposed under normal lighting conditions. But the results were largely unsatisfactory because of subject and camera movement during exposure, and also because the shadows tended to lack density and detail.

This is probably a good place to stop and look at the contrast problem in 35-mm work, particularly as it applies to available-light negatives. It is important that we recognize two different kinds of contrast as existing side-by-side in the same negative. The first kind of contrast is over-all highlight contrast, often referred to as "blocking contrast." This is the contrast that exists between the thinnest and the densest negative areas. Unless we are intentionally striving for a special off-beat effect we want this highlight contrast to be comfortably low so that our highlights as well as our shadow areas will print realistically. The second kind of contrast is shadow-area contrast, sometimes called "interior contrast." By this we mean the amount of contrast which exists among the thinner values in the negative. In general, it is most desirable that this contrast be rather high in order that objects and tone values in the shadow areas of the picture should be readily discernible. The ideal developer for available-light work would therefore produce low over-all highlight contrast to avoid blocking up and high interior shadow contrast to produce readily discernible shadow detail.

The second era in available-light film processing involved over- or "forced" development. The initial experiments involved giving very long immersion times in low-contrast fine-grain and medium-fine-grain developers. This was soon discarded because, although the over-all highlight contrast was only slightly lower than normal, the interior shadow contrast was far too low and well-illuminated subject areas tended to have a pasty and sometimes unsharp appearance. Later, moderately longer immersions in fairly active and specially souped-up developers were tried. This produced very good shadow detail and contrast, but the blocking contrast was very high and the grain pattern was horrible.

In the third era, today, forced development is resorted to only rarely. Good available-light technique today consists in giving a moderate immersion in fairly active soft-working developers. Available-light photographers who use Tri-X film with Kodak D-76 developer, to provide one outstanding example, give the same immersion period for an ASA 650-800 speed rating which Eastman Kodak recommends from an ASA 160 rating. The answer to this seemingly paradoxical situation is that present-day photographers have learned to obtain the high effective film speeds they need in order to make pictures conveniently in dim light not by abusing the film but by fully exploiting its exposure and development latitude. The chart on available-light development of various films (page 92) contains much specific information which should be relied upon as a departure point for your own experiments.

Of all the booby traps which have afflicted photography none is more pernicious than the myth that overexposure

and underdevelopment is the key to fine grain and success. It is not. Increasing exposure and cutting development is an excellent remedial procedure that can be extremely valuable when photographing excessively contrasty subject matter where a normal contrast result is desired. As a general doctrine for exposure under normal subject lighting conditions, it has the result of producing very poor resolution and very low interior shadow contrast. When the results are less grainy than those obtained from normal exposure and processing what you are really getting is a pseudo fine-grain effect caused by the under- or non-development of tone values within the subject.

The goal in all normal-purpose black-and-white photography, and most especially in 35-mm practice, should be to give the shortest exposure which, when coupled with full development in a moderately active soft-working formula, produces the minimum amount of negative density required to yield the shadow and highlight detail and contrast required for our own particular purposes, as well as a long scale of negative gradations in the "middle tones."

Now let's see how to get the best out of our selection. There may be people who enjoy spotting prints, but we've never met them. When you stretch that little 35-mm negative out to make an 8x10- or 11x14-inch enlargement you're magnifying every scratch, pinhole, speck of dust, and scrap of dirt on the negative. On ten- and fifteen-diameter blow-ups, which are very common today, with the wonderful cameras and lenses now available a tiny spot of grime can expand into a golf ball. The only answer to this entirely avoidable problem is the exercise of appropriate care and cleanliness throughout the entire photographic process.

Let's start with the camera. It's a good idea to clean out the "box" whenever you get a chance. This means as often as possible. When you open the camera back outdoors to load it a certain amount of air-borne dust and dirt is bound to enter the camera. A tremendous amount of the dirt in our own cameras seems to come from chips of paint which fall off the gaudily adorned commercial film cartridges. A blower-brush is just the thing for getting rid of most of this debris. Remember, fine pieces of foreign matter adhering to the film during exposure produce tiny unexposed areas which will print as black dots.

If you load your own 35-mm film from bulk—an excellent and very easy way in which to cut your film cost by as much as 80 percent!—keep your film-loader clean by giving it a thorough blower-brush treatment each time you use the gadget. Don't leave the cassettes or cartridges in which you load your bulk film around in the open to attract grime. Keep them tightly sealed in 35-mm film cans with screw-tops. Before you re-use a commercial cartridge clean it thoroughly and inspect it for any shape distortion. If it doesn't look 100 percent perfect, don't take a chance, ditch it. The best film loaders are those in which the film passes freely through air on its way to the jaws

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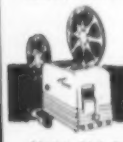

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of the film cartridge. Certain loaders which force the film to travel through a tight felt or velvet-lined channel are almost impossible to keep clean and have a tendency to produce scratches. And don't race the film at high speed through the loader. No prizes are given for the fastest bulk loader, and scratches can easily result from the felt jaws of the cartridge alone. Of course, light-tight cassettes as supplied by the various camera manufacturers are best because they have no felt jaws. The drawback is their high cost—$3 to $5 apiece. Good clean loads can be made with re-usable commercial cassettes such as Eastman's and Ansco's, but it takes a little more care.

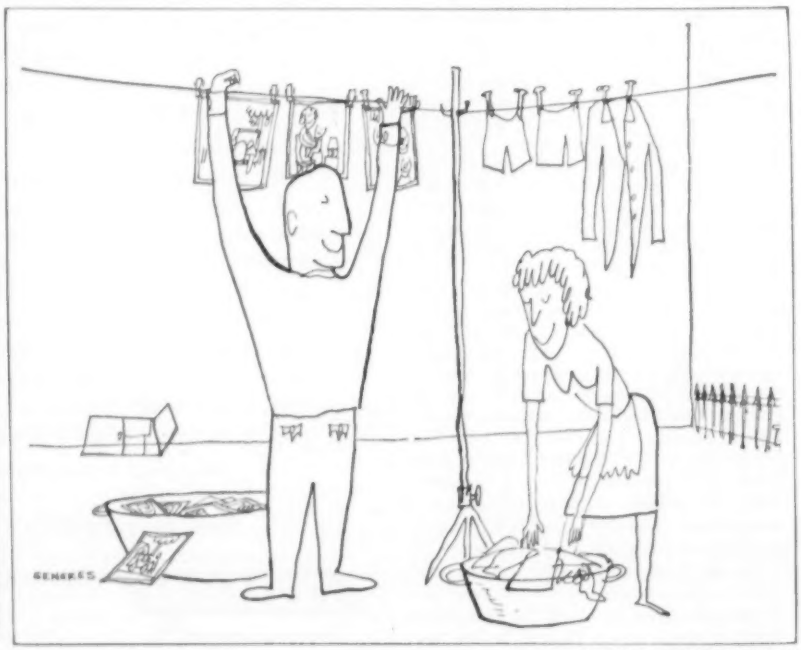
Most negative abrasions and dust marks occur in the darkroom. Dust the place thoroughly from time to time, but don't work in it until you've allowed some time for the irreducible minimum of dust to settle again. Solutions should be thoroughly mixed and filtered after each use. Filter paper is best for this purpose but a wad of top-grade surgical cotton which is made of long-staple cotton will suffice. Almost everyone agitates during development, but many people never even shake the film once after they drop it into the hypo. Good vigorous agitation upon entering the hypo, again after half the time is up, and just once more before leaving the hypo, is not only conducive to better fixation but to superior cleanliness as well. Nothing, not even dirty developer, is as injurious as a fixing bath loaded with miscellaneous foreign particles.

Keep your solution temperatures as close to 69 F as is humanly possible, and don't allow more than a few degrees variation between solutions. When film is placed in solutions of warmer-than-normal temperatures it becomes very soft and swells up. This allows foreign matter to penetrate the emulsion and later to dry inside where you can't touch it. In addition, much of what is frequently passed off as excessive graininess is actually incipient reticulation caused by plunging film from a cool solution into a warm one or the other way around.

After the films have been allowed to wash in freely running water at 68 F for about 20 minutes they should be soaked in a solution of water loaded with some wetting agent such as Aerosol or Photoflo. These wetting agents break down the surface tension of the water and prevent the formation of water spots on drying films. After the wetting-agent bath, the film can be hung up to dry as it is, or it can be sponged off with a good-quality photographic sponge. If you prefer to wipe off the excess water with a sponge make sure that it's clean.

If you exercise these precautions your negatives should usually be free of dust and dirt. But with 35-mm, this is never 100 percent perfect, and it is an Absolute Law that if one negative on a roll of 36 is dust-spotted or scratched, that negative invariably is the best picture on the roll. In these cases, a glassless negative carrier is an advantage because you can apply a thin coating of vaseline with your thumb and forefinger over the entire area of both sides of the negative.

The way we apply vaseline is to moisten very slightly the forefinger of the right hand in the vaseline jar, rub this finger over the thumb, and then apply to both sides of the negative with uniformly firm strokes. Then, before placing the negative in the carrier we go back over the negative with the dry thumb and forefinger of our left hand. In this way, the coating is made very thin and very even. The vaseline fills in most normal scratch marks and effectively frees the negative of dust and dirt. If you apply too much vaseline your print will have a streaky appearance, but with a thin coating it remains invisible and the prints will hardly ever require spotting.—



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Argus C 2 f3.5 RF		17.50
Argus C 4 f2.8 RF	$84.50	42.50
Bolsey B 2	69.50	32.50
Kodak 35 f3.5 RF		28.50
Kodak Retina II f2 RF		57.00
Kodak Retina IIA f2 RF	127.50	72.50
Kodak Signet f3.5 RF	75.00	43.50
Vitessa f2 RF	127.50	82.50
Prominent f2 RF	220.00	129.50
Prominent f1.5 RF	295.00	149.50
Graphic 35 Case, Flash	89.50	54.50

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	NEW	USED
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Ciroflex D		34.50
Exakta 66 f2.8	$319.50	182.50
Hasselblad f2.8	379.50	199.50
Ikoflex VI f3.5	44.95	19.95
Rolleicord V f3.5	134.55	94.50
Rollei Auto Latest f3.5 Tessar	232.50	124.95
Rollei Auto 28C	291.50	179.50

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Kodak Chevron f3.5	$198.50	$139.50
Kodak Medalist I f3.5		55.00
Kodak Medalist II f3.5	304.75	110.00
Polaroid Highlander	69.96	39.95
Polaroid Speedlight	89.75	37.50
Polaroid Pathfinder	$248.50	$147.50
Zeiss Super Ikonta A	99.00	49.50
Zeiss Super Ikonta B	139.00	64.50
Zeiss Super Ikonta C	114.00	49.50
Zeiss Super Ikonta BX	163.00	79.50
Voigtlander Bessa II f3.5 RF	124.50	67.50

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23 Linhof Complete Three Lenses	569.90	319.50
45 Linhof Super Tech. f4.5	389.75	199.50

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	NEW	USED
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28mm f3.5 Serenar	134.00	79.50
28mm f3.5 Nikkor	139.50	92.50
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35mm f3.2 Serenar	94.00	69.50
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50mm f1.5 Summarit	177.00	110.00
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movie section

Available-light

A top technician tells how to shoot 8- and 16-mm films by existing light without

Photograph by Werner Luchinger

Strong sunlight coming through a window illuminated this interior, and allowed the photographer to produce this picture on a standard-speed film.

By JOHN DURNIAK

movies

Street lamps furnish enough light to allow shooting such scenes with 8- or 16-mm camera.

special equipment or super-high-speed emulsions

By ERNST WILDI

"There's not enough light to take movies!"

How many times have you used this excuse, and believed your statement was true? But was it true? Available-light black-and-white motion pictures with 8- or 16-mm cameras *without special equipment* can be made more frequently than you think. Even with a camera equipped with only an *f*/2.8 lens and standard film you can make pictures of friends seated near normal living-room lamps, evening city street scenes, and often indoor theatre and sporting events.

There are many advantages to available-light pictures. You can get candid, true-to-life films. Your subjects do not have to squint into bright floodlights. People act more naturally under normal roomlight and skin tones are not burnt-out. When shooting under existing light, you don't have to worry about fuses blowing out, light-stands falling, extension cords inviting trips, and whether an assistant will do what he is supposed to do.

Now, let us talk more specifically about the different elements to be considered when shooting.

Lighting: The available-light motion-picture photographer should train himself to be "light conscious." On entering a room where you expect to make a film, you should almost automatically evaluate the condition of the light. Such questions should be answered: Is there daylight streaming through the window that will help roomlighting? Are the shades over lamps light- or dark-colored? Are there extremes in lighting—bright spots in some places, darkness elsewhere?

There are several things the photographer can do beforehand to help available-light conditions. If a party is to be held in your home and you expect to shoot it, you may replace heavy, dark lampshades with thinner, light-colored ones for the evening. You could also plan to have some of the top events of the party take place in well-lighted rooms, or rooms with light-colored walls which will build up the illumination by reflection. (**See chart, page 122.**)

Lights can be moved around for best positioning. You can approximate where your subjects will be standing or sitting and move your floor lamp or table lamp accordingly.

Interesting lighting is obtained if you turn on overhead room lights (if you have them) along with your table or floor lamps. A lamp burning a (*Continued on page* 123)

Table lamp and overhead light provide main and fill-in illumination in home living rooms.

Movie-theatre entrances often produce more light than required for good film exposure.

Photographs above by Ernst Wildi

Natural expressions can be caught when filming with room light, especially with children.

By JOHN DURNIAK

Photographs by author

Dual-purpose lens

Adapter made to fit all 8-mm and most 16-mm normal lenses fits over lens. Either end of Dual Lens can be screwed onto the adapter ring depending on the field of view desired.

Dual Lens in telephoto position (top) magnifies, in wide-angle position (above) reduces.

Attachment converts normal 8- or 16-mm movie lens to telephoto and wide-angle

AN INGENIOUS, low-cost attachment ($24.95) that changes all 8-mm and most 16-mm normal movie-camera lenses into wide-angle and telephoto lenses is being manufactured by Ednalite Optical Co., Inc., Peekskill, N. Y. The Dual Lens is compact (can fit easily into a vest pocket), and screws quickly into an adapter ring on the normal camera lens. It gives photographers having only one lens, three-lens versatility with a minimum of effort involved.

But how does the lens work? If you have ever looked into the right end of a pair of binoculars and then turned them around to look into the wrong end, you have a basis for understanding the Dual Lens. When you look through one end of the new attachment things before you are magnified. When you turn it around, images are reduced. The lens delivers images to your normal lens either magnified or reduced, thus giving a telephoto or wide-angle effect.

Viewfinding, usually the greatest problem with such attachments, is taken care of in the case of simple cameras that have no adjustable viewfinders. Ednalite makes the Auxiliary Ednalite View finder which snaps onto the Dual Lens. Once the red arrow on the finder is lined up with the red dot on the lens, the lens can be turned either way with the finder automatically ready for use. With adjustable viewfinders on more complex cameras, just flip over to telephoto viewing position or wide-angle viewing position and you automatically get the proper field of view.

Now, let's be more specific about the technical elements of the Dual Lens.

Focal lengths: This auxiliary lens, with 8-mm cameras and normal lenses having focal lengths of 13-mm, will give approximately a 20-mm focal length when in telephoto position and 8-mm focal length when in wide-angle position.

For 16-mm cameras, a normal lens of 25-mm focal length becomes 38-mm when the telephoto side is forward, and 16-mm when the wide-angle side is up front.

Focus: For cameras having fixed-focus lenses, the photographer should attach the Dual Lens to his normal lens, making sure the red arrow, if he is using the telephoto side—or the blue arrow, if he is using the wide-angle side, is pointing toward his subject.

For use with focusing lenses, place attachment over (*Continued on page* 123)

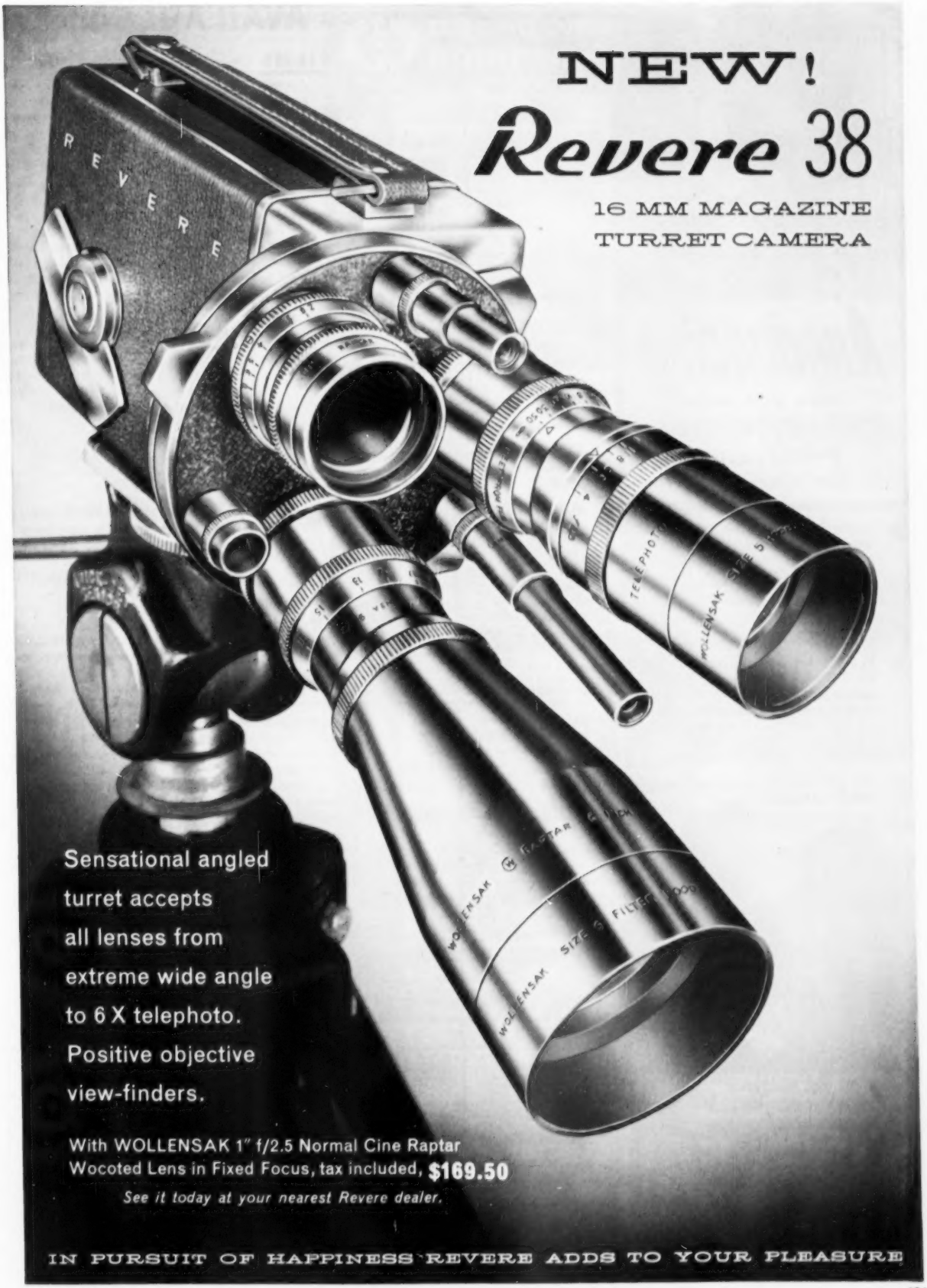
Using wide-angle side

Normal lens, no attachment

Using telephoto side

Frames enlarged from film made with 16-mm motion picture camera show change that occurs when opposite sides of Dual Lens attachment are placed over normal lens.

Easy-to-use screwtype adapter rings allow the photographer to make quick changes.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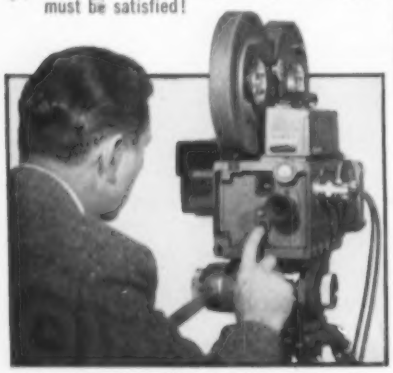

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AVAILABLE-LIGHT

FILMS

		16-mm roll	16-mm mag.	8-mm roll	8-mm mag.
GROUP I ASA 25-40	Kodak Super-X	●	●	●	
	Ansco Hypan	●	●	●	●
	Ansco Supreme Negative	●			
	Du Pont 914	●			
	Kin-O-Lux TV Reversal	●		●	
	Gevapan 26	●		●	
GROUP II ASA 60-80	Kodak Super-XX	●	●		
	Du Pont 930	●			
	Du Pont 901	●			
	Gevapan 32	●			
GROUP III ASA over 100	Kodak Tri-X	●			
	Du Pont 931	●			
	Kin-O-Lux Gold Seal	●		●	

EXPOSURES

SUBJECT AND LOCATION	LIGHTING	APERTURE BASED ON 16 FRAMES PER SECOND: Films of Group I	Films of Group II	Films of Group III
Portraits in living room	*Table lamp with 150-watt bulb and light-colored shade close by*	f/1.9	f/2	f/2.8
Portraits in living room	*Same as above plus overhead light*	f/2.8	f/4	f/5.6
Living rooms, kitchens, offices, or showrooms	*Good overhead light, regular or fluorescent*	f/1.9	f/2.1	f/4
Living rooms, offices	*Daylight through two or more windows*	f/1.9	f/2.8	f/4
Subway stations	*Good fluorescent light*	f/1.5	f/1.9	f/2.8
Subway stations	*Tungsten lighting*			f/1.4
Child in front of birthday cake	*Light from several candles, plus overhead light*	f/1.5	f/1.9	f/2.8
Portrait in candlelight	*One candle about 1 foot away from face*			f/1.4
Inside a church	*Regular overhead or daylight*		f/1.5	f/2
Under a movie marquee	*Light from marquee*	f/1.9 f/2.8	f/2.8 f/4	f/5.6
Gasoline stations, Used-car lots, Toll stations	*Well lighted*	f/1.5	f/2	f/2.8
Cars on highway	*Headlights of cars, plus streetlights*	f/1.5	f/1.5	f/1.9
Portrait under single streetlight				f/1.4
Amusement park	*Well-lighted booths, hot-dog, ice-cream stands*	f/2.8	f/4	f/5.6 f/8

variations in the spread of light are small and your aperture need not be changed

permissible. When using this setting, try to set up so that there is a minimum of

MOVIES

(*Continued from page* 119)

60-, 75-, or 100-watt bulb placed anywhere from three to eight feet from the subject provides a main light, and the overhead light provides the fill-in. You can vary the distance of your lamp depending on what sort of effect you are after. Judge this effect beforehand by trial and error with a stand-in subject. If the side of your subject's face that is toward the lamp is lighter than the other side (which is illuminated by the overhead light) you have a good lighting setup. The lighting contrast can be increased or decreased by moving the lamp closer or farther away.

A table or floor lamp can also serve as a backlight—outlining the model's face and shoulders and thereby separating the subject from the background. In this case, the overhead light serves as the main light.

Beware of indirect lighting. It often leaves the room fairly dark, and the results are nearly always unsatisfactory.

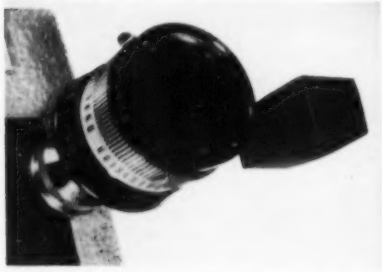
Directly overhead lighting fixtures on ceilings, like those found in kitchens, are excellent. With such units the lighting

(*Continued on next page*)

Dual-purpose Lens

(*Continued from page* 120)

lens. For telephoto effects, find the distance from camera to subject and divide this number by two. For example, if you want a telephoto shot of someone 10 feet away, divide 10 by 2. The result is 5 feet. Set your focusing scale at 5 feet and shoot. With the wide-angle side forward, again find the distance your camera is from the subject. Again let us say it is 10 feet. This time multiply your distance by two. The result, 20 feet, is the distance at which you should set your scale for wide-angle effects.



Viewfinder attachment fits on Dual Lens and is automatically coupled so that lens can be used on either side without readjusting finder.

When your subject is at infinity, no compensation is needed. Just set your scale at infinity with either side of the lens forward.

Filters: The attachment has provisions to take a standard series I, IV, or V filter. The filter should be placed in the rear mount of the lens attachment. If the photographer wants to use the filter without the attachment, all he has to do is to remove it. The adapter ring is left on the lens with the filter in it.—

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variations in the spread of light are small and your aperture need not be changed when moving around the room.

Night Outdoors: There is a wealth of outdoor material for available-light movies. Amusement parks, water scenes, metropolitan street scenes, car lots, new shopping centers, and some sporting events are just a few possible scenes. Neon signs and street lights can be used as backlights for silhouettes of people and to provide interesting main lights. Blinking lights can be used for unusual effects.

Exposure: For accuracy in exposure, a meter should be used. For even greater accuracy, shoot a test film. Since lighting conditions vary widely from one situation to another it is impossible to set down definite rules for exposure by means of a chart. However, I have compiled a basic chart (see page 122) as a reference for photographers lacking meters, or for those who have meters with less-sensitive photoelectric cells that are of little value in low-intensity light situations. From my experiments I have found that if an exposure is one stop over or one stop under what the situation demands, good results are still obtainable.

Test Film: A test film requires shooting of only one roll of film. For the cost of about three dollars (the price of an 8-mm roll of film) you can obtain a reliable guide for shooting in any part of your home—day or night. On your test film include all areas where you expect to do your shooting. Make shots where you expect your next party to be, or where you may photograph your children or pets. Be sure that the lights turned on are the same as those you will use at the time of your shooting. Jot down all *f*-openings and camera speeds that you employ. When the roll comes back from the processing lab, check it with your notes and make an exposure chart for various rooms and lighting conditions. Such a chart will enable you to shoot, at any time, movies in your home with good exposure under available light.

Shutter Speed: In cases where the available light is insufficient to get correct exposure, the camera could be used at 8-frames-per-second provided that the accelerated motions on the screen are permissible. When using this setting, try to set up so that there is a minimum of motion in your scene, or so that moving objects are at a distance.

With 16-mm: Shooting possibilities with 16-mm cameras are increased, because of the availability of more sensitive emulsions in this film size. I have obtained excellently exposed films inside churches, stores, subway stations, and living rooms, and outdoors in streets, using a regular *f*/1.9 lens for both conditions.

The new Kodak Tri-X film is rapidly paving the way to new fields in 16-mm movie making. This new fast emulsion makes it possible to capture scenes which previously were considered impossible. After experimenting, I was amazed to discover just how little light is actually needed to get a good picture. The glow of a single candle was enough to illuminate a subject. A single street lamp enabled me to get a shot of a lady waiting for a bus. At present Tri-X is available only in 16-mm negative roll film. Price of the film does not include processing. After the film is exposed it is sent to a regular custom laboratory (*not* the Eastman Kodak Company). There it is processed to a negative. If requested, a positive print for projection is also made at the laboratory at extra cost. If you shoot more than one roll of film you may want to examine the negatives first and cut out any unneeded footage before having a positive print made. Tri-X film is rated at ASA 160 for tungsten and 200 for daylight. However, film tests have shown that ratings considerably higher (ASA 300 to 600) can be used.

The Future: With the coming of new high-speed lenses, fast-emulsion films, and high-powered developers, the future looks bright for available motion-picture photography. It may not be too far in the future when motion-picture photographers will have many of the advantages that 35-mm still available-light photographers now have. But you need not wait for all these things to come into being. Available-light films are now at your finger tips. Experimentation and some imagination can pay off in amazing results. Try a roll of your own black-and-white film and see for yourself.—

35-mm Enlarging

(Continued from page 95)

but will give a light salt-and-pepper effect throughout the middle-tone values.

Because this grain pattern is part of the image-forming silver itself it is essential that we focus sharply on the grain if we want to produce sharp photographs. We make no brief for grain and are as much opposed to its ugly presence as any man, but if there's one thing more disagreeable than a grainy print it is a print in which the enlarger was not focused accurately. Many people achieve fantastic pseudo-fine-grain prints simply by intentionally or accidentally misfocusing the enlarger. The effect may be fine-grained, but is it really photography? Interestingly enough, with a really grainy negative a slight shift out of focus by the enlarger creates an effect which gives the appearance of being much grainier than an in-focus print. You cannot focus on your negative without bringing the grain into focus.

To help you achieve this kind of sharp focus several manufacturers offer focusing aids which are placed on the baseboard of the enlarger so that the image from the enlarger lens is reflected up to the eye via a 45-degree mirror arrangement and magnified. Some of these gadgets are good, some are not. Some people are happy with some, others are not. Our one piece of advice: get a free trial period and test the thing out before you buy it. One of the best aids to sharp enlarger focusing is a switch that will throw off all your safelights while focusing the enlarger. In blackness with only the light streaming through the enlarger lens it is much more easy to focus critically.

Normal 35-mm out-of-door and other well-exposed and -developed negatives require no treatment differing from standard practice in enlarging other negative formats. Everything you know about

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100' Roll Plus-X Neg. Super XX Neg., Bkgrd.-X ..... 3 for 3.25
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8x10	SWGL	#1, 2	100 sh.	3.50
8x10	SWGL	#1, 3	125 sh.	4.25
8x10	DWSM	#2, 3	100 sh.	3.75
8x10	DW Cr. Wh. Lustre	#1, 2, 3, 4	100 sh.	4.25
8x10	DW Brov. Vel.	#1, 2, 3, 4	125 sh.	4.95
8x10	SW Resisto Rapid	#1, 3	125 sh.	4.25
8x10	DWSM	#1	200 sh.	3.95
10x10	SWSG	Varigam	125 sh.	4.00
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quire no treatment differing from standard practice in enlarging other negative formats. Everything you know about dodging thin negative areas and burning-in heavy ones will stand you in good stead. However, because your magnifications with 35-mm will be much greater on the average any defects in the enlarger are going to become more apparent. The two most important are hot-spots and faulty alignment of the negative carrier in relation to the lens. Most good enlarging lenses do give some degree of hot-spotting at their widest apertures. However by f/8 this should clear up acceptably in even the cheapest lenses. Some machines provide easy access to the alignment screws and many photographers are able to correct minor adjustments that are required. In most cases a qualified camera repairman, the store from which you purchased it, or the enlarger manufacturer should be consulted.

Many photographers alter their enlarging technique for 35-mm by diluting their print developers 1-to-1 with water instead of 1-to-2, which is usually required. This somewhat increases the developer's ability to separate tones in the more-thinly exposed negative areas. Another big help which is especially advantageous in handling 35-mm negatives is the addition of a small amount of benzotriazole (Anti-Fog #1) to the tray of print developer. This restrainer has the effect of allowing you to develop the blacks longer without materially affecting the whites. Prints should always be developed for the full time, usually about 90 seconds. If your exposure was so great that the print rushed up at you very rapidly it will be muddy and lack good clean blacks and sparkling whites. Print exposure should always be aimed at the developing time specified by the manufacturer.

35-mm available-light negatives often give trouble when exposure or development was somewhat off base. What generally happens is that over-all negative contrast is higher than we want and highlights appear as washed-out dead whites. At the same time the shadow areas, which usually contain our main subjects, are much too flat. One beautiful solution to this problem which is very popular in professional 35-mm practice today is the application of a two- or three-filter Varigam technique. Here's how this works:

Varigam is a multigrade printing paper on which we can achieve the contrast equivalent to anything from a "½" paper which would be flatter than a No. 1 graded paper, to a "3½", which would be slightly less contrasty than a No. 4 grade of normal paper. This is achieved by a series of ten colored filters which are used in front of the enlarging lens during exposure. The No. 5 Varigam filter cor-

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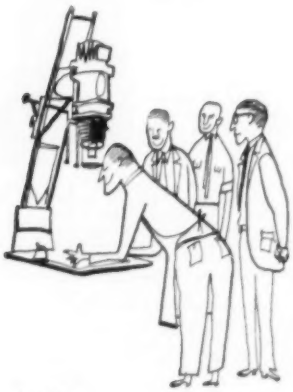
responds to a standard grade of No. 2 filter, as does Varigam when used with no filter at all. The No. 10 filter gives the maximum contrast with Varigam, the No. 1 the minimum. Incidentally, there are two grades of Varigam, high-speed and slow-speed. The slow-speed paper is slightly more contrasty, Varigam filter for filter, than the high-speed paper. This is particularly noticeable with the No. 8, 9, and 10 high-contrast filters.

Getting back to our problem negative which is too contrasty over-all but lacks contrast in the shadows. If we print on a soft grade of paper or with a low Varigam filter the over-all contrast comes out fine but the shadows are mushy and lack detail. On the other hand, if we print on a high-contrast grade of paper or with a high Varigam filter we may get our shadow contrast up to the point we want, but our over-all contrast will be far too high. The answer in many cases is to use Varigam and give part of the exposure through a high-contrast filter and part through a low-contrast filter. In an average case, for example, we might divide our exposure between the No. 8 and the No. 3 filter. The No. 8 filter will work most in the thin flat areas, the No. 3 in the dense contrasty portions of the negative. Sometimes called "automatic over-all dodging," this technique is most advantageous where standard techniques of holding-back or burning-in are difficult or impossible. For some mysterious reason it is essential in two or three filter Varigam printing that you use the contrasty filters first and wind up with the low-numbered ones.

Very often in enlarging 35-mm negatives we will run into the problem of the print which contains large expanses of relatively unimportant neutral-gray tones which contain excessive grain. This graininess can frequently be diminished, and the picture actually enhanced, by holding-back or burning-in the grainy expanse so that it prints either as an almost-white or an almost-black. These bones simply do not show grain in the manner of a neutral gray.

In the main, however, with good technique in exposure and development, grain is not really the problem today that it once was. The main thing to remember when you do get grain is to keep your prints down to conservative magnifications. Or, in less technical language: make smaller prints.—



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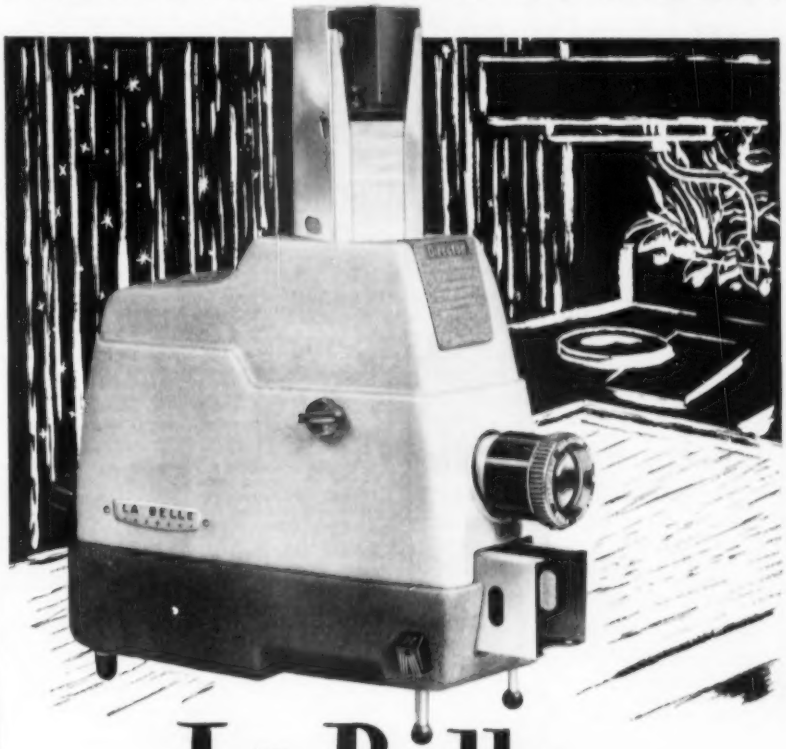

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CAMERAS & ACCESSORIES

MAKRO-KILAR lens (see POPULAR PHOTOGRAPHY March 1955, pg. 86) is now available in two models for the 35-mm single-lens reflex Rectaflex camera. This lens can be used for normal, wide-angle, and close-up photography without the use of supplementary attachments. Makro-Kilar D permits focusing from inf. to about three in., providing a maximum image-to-subject ratio of 1:1:1. Makro-Kilar E permits focusing from inf. to about five in. from subject, providing a maximum image-to-subject ratio of 1:2. Other features are aperture range from *f*/3.5 to *f*/22; 40-mm focal length; three scales, one for distance, another indicating automatically image-to-subject ratio, and a third which automatically indicates the amount of exposure increase necessary when taking close-ups. Distributed by Omic-Rectaflex, 202 W. 40th St., New York 18, prices are $114.95 for the D and $89.95 for the E.

SUPER BALDINA outfit consisting of this 35-mm camera, case, and B-C flashgun, is announced by Kling Photo Corp., 235 Fourth Ave., New York 3. The camera features a 50-mm *f*/2.8 lens in a telescoping mount; nine shutter speeds to 1/300 sec & B; self-timer; synchronized for regular and electronic flash; rapid film advance which also cocks shutter; double-exposure prevention; automatic exposure counter; depth-of-field scale; coupled rangefinder combined with life-size viewfinder in one window. Price is $69.50. Another outfit, the Baldina 35 (similar to above but without rangefinder) is priced at $49.95.

GRAFLEX INC., 154 Clarissa St., Rochester 8, N. Y., announces the availability of a new Compur shutter as standard equipment on the Speed Graphic press camera. Featuring a Kodak Ektar *f*/4.7 lens, the shutter uses a bi-post synch connector; is equipped with a press focus lever and an ASA bayonet synchronizer fitting.

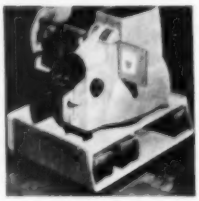
SUPER BALDAX is introduced by Kling Photo Corp., 235 Fourth Ave., New York 3. Designed for compactness, it measures 5x3¾x1¾ in.; takes 12 2¼x2¼ exp on No. 120 rollfilm; has a coupled rangefinder and viewfinder combined in one unit; shutter has nine speeds from one to 1/300 sec & B; full flash synchronization at all speeds; double-exposure prevention; depth-of-field scale. With an 80-mm Rodenstock *f*/2.9 lens in helical focusing mount, price is $79.95.

LENSES & ACCESSORIES

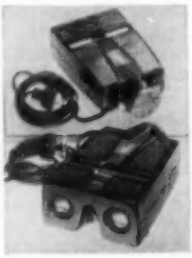
135-mm SOLIGOR *f*/4.5 lenses for the Argus C2 and C3 cameras are announced by Interstate Photo Supply Corp., 17 W. 17th St., New York 11. Coupling to gear between rangefinder and lens, an initial adjustment locks it in place. Other features are click stops; depth-of-field scale; compensating viewfinder field mask; front and rear lens caps. Price of $49.95 includes registration, 6-month guarantee, and fitted box. More information available.

VIDOSCOPE is the name of a 16-mm anamorphic lens that fits all 16-mm projectors. The design is exactly like the 35-mm lens now used in CinemaScope projection. Walter Futter, 625 Madison Ave., New York City, claims this lens improves picture clarity and eliminates distortion. An adapter is supplied for attachment to most projectors and a special adapter is available for attachment to Jan or Bell & Howell professional projectors. Price is approximately $150 and additional information is available.

PROJECTION & VIEWING EQUIPMENT



TDC PROJECTORS for 2x2 slides are announced in two new models, the Deluxe Model D (300-watt) and the Streamliner 500 (500-watt). A new feature is wind-tunnel cooling; air is scooped through a chamber beneath the projector and up through the cooling chamber at high speed. This is claimed to prevent cardboard slides from "popping" and slipping out of focus under normal operating conditions. In the case, storage space is provided for six or more Selectrays. Both models have a 5-in. *f*/3.5 coated lens. Manufactured by Bell & Howell, 7100 McCormick Rd., Chicago 45, prices (incl. case and Semimatic changer) are, respectively, $74.75 and $79.95.



REALIST INC., 315 W. Court St., Milwaukee, Wis., introduces a viewer featuring quick-change cartridges for converting the unit from battery to 110-v illumination at the turn of a release button. Other features are thumb-wheel focusing at film plane; color-corrected optical-glass lenses; full color-temperature control with index marks for resetting. Price is $24.50.

FLASH

DUAL BEAM FOLDING REFLECTOR is claimed by Camera Optics Corp., 101 W. 47th St., New York 36, as being the first of its type to be made of rust-proof stainless steel. It can be locked in either of two positions, for concentrated or pan light. Price of reflector alone is $2.95 but is available also on four flashgun models, prices ranging from $7.95 to $16.50. More information available from the manufacturer.

AMGLO CORP., 2037 W. Division St., Chicago 25, introduces a 28-oz speedlight which may be operated from an a-c line or from a choice of three sizes of battery packs. Guide numbers range from 140 for black-and-white tover 600 when Power Doubler is used), and from 45 to 120 for color films. Recycling time is four sec on a-c operation. 60-A lamphead with an average life of over 100,000 flashes, is $69.95, and battery packs are priced at $35, $39.95, and $55. Power Doubler (built into heavy-duty pack) is available separately for $24.95.

MISCELLANEOUS

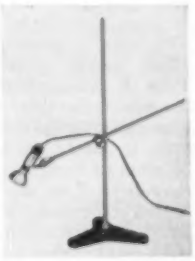
CABLE RELEASES in lengths of 10, 20, and 40 ft are announced by Spiratone, Inc., 49 W. 27th St., New York City. These accessories feature an oversize plunger for easy gripping; a special booster arrange-

ment assuring a smooth stroke; universal-type threading; threaded parts for disassembly if adjustments are necessary. Prices are, respectively, $5.49, $8.49, and $14.49.

SET FOCUS ENLARGER for 35-mm negative or transparencies is announced by the Boyer Engineering Co., 7112 East Wardlow Rd., Long Beach 8, Calif. No adjustments are necessary since it is claimed to be always in focus. Other features are: print size of 3½x5 in; 50-mm f/4.5 lens; ventilated, 50-watt lamp; polished film gate. The price is $27.50.

PROXISCOPE SR., a universal tripod and copying-stand accessory for critical close-up work, is an elevator attachment as well. The camera platform rides on a geared monorail for a distance of four in. in either direction. Locking lever is positioned alongside the focusing knob. Two tripod sockets (at right angles to each other) permit vertical or horizontal positioning of the rail. A reversible tripod mount allows the Proxiscope to point downward below tripod-head level. Price is $4.95 and the distributor is Spiratone, Inc., 49 W. 27th St., New York 1.

POLAPAN 200 AND 400 are the new, faster films for the Polaroid Land cameras. They are claimed by Polaroid Corp., Cambridge 38, Mass., to have greater depth, richness, and exposure latitude than the currently available Type 41 film. With the faster 400 (ASA index) film, adequate illumination for photography is supplied by a 150-watt lamp. Presently available for the Speedliner and Pathfinder cameras, the film is priced at $1.98 for PolaPan 200 and $2.19 for the 400; both are eight-exposure rolls.



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MICROSCOPE ADAPTER is designed to fit the Hasselblad 2¼x2¼ single-lens reflex camera. When fitted to a microscope it permits the camera to be used in many phases of scientific, medical, and research photography. The bellows of the adapter is tipped with a velvet-lined connector which fastens to the microscope. Price is $24. More information available from Willoughbys-Wholesale, 110 W. 32nd St., New York 1.

MATTE BOX and sunshade for 8- and 16-mm movie cameras is designed for use with 2- and 3-in.-square glass or gelatin filters and accessories. Constructed of aluminum castings with dural front rods, the base supplied will fit all cameras and has both small and large tripod threads. Taking all lenses from 15- to 152-mm focal length, rubber caps are supplied to eliminate flare when lens used is smaller than back opening. Interior is finished in optical black. A finder extension bracket or adapters may be required for some professional cameras. Price, incl. fiber filter holders, is $44.95. Manufacturer is National Cine Equipment, Inc., 209 W. 48th St., New York 36.—

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35-mm Color

(Continued from page 72)

of a 24x36-mm Kodachrome transparency than from other color films in sizes up to and including 4x5.

But Kodachrome is slow: the exposure index is only 10 in the daylight emulsion, 16 in the tungsten version. And much as it is respected for its other qualities, when there isn't light enough to shoot it, or when it is necessary to employ very fast shutter speeds or very small lens openings, these qualities count for little. Two new color films, Eastman's E-2 Ektachrome and Ansco's Anscochrome (successor to Ansco Color), have recently been released with daylight speed ratings of 32. But no sooner had these films arrived than they were immediately subjected to the untender mercies of the available-light crowd who, with their usual contempt for manufacturers' speed ratings, began shooting these films at exposure indexes of 64 and 125—and with good effect.

Neither E-2 Ektachrome nor Anscochrome is in the same league with Kodachrome in the grain and resolution departments. But both yield mildly grainy transparencies with adequate resolution for most purposes, good color balance, sufficient exposure latitude, and what's more—speed.

Probably the best way to describe the color quality, or balance, of these films is to describe how they tend to misbehave. When Kodachrome goes wrong it is generally saturated with an overdose of cold, blue tones. Ektachrome has a marked tendency toward overly warm yellowish tones, especially when exposed at, (and processed for), high emulsion speeds. And, when you manhandle Anscochrome it's a sure bet that the film will get even by turning greenish.

The first step in avoiding any of these mishaps is, of course, accurate exposure determination with a good-quality exposure meter. The debate as to the merits for color work of the incident-light or the reflected-light meter is an old and tedious one, and we have no intention of settling it here. Both meters have their advantages although it must be admitted that really good incident-light meters do arrive at their decisions with less contribution by the photographer than is needed for accurate use of the reflected-light meter.

Corrective filters, of which the Kodak Wratten 1-A or Skylight filter is perhaps the most useful, constitute the second step. This very transparent filter has the ability to take the edge off overly saturated blues and is most valuable in combatting blue shadows with both Kodachrome and Ektachrome. Although we have used this filter with Anscochrome, and with some success, it is much less needed with this film than with the two Kodak products. The tendency of Anscochrome to turn greenish takes two forms. In the first form we have a scene in which so-called neutral values like whites, grays, flesh-tones, etc. actually are saturated with green light from nearby foliage. If we stop and observe very carefully we will see this green tinge. Photograph the scene with either Kodak material and it may record, but only very faintly. Shoot with Anscochrome and it will be more greatly pronounced, especially if your exposure is sufficiently inaccurate to darken and compress other color values. The remedy is accurate exposure and the use of a color-compensating filter that will absorb green. In green surroundings a CC 05 M magenta filter takes out quite a bit of green tinge and carries no filter factor. For more-stubborn cases the CC 10M and the CC 20 M, which require a filter factor (increase in exposure) of ⅓ of a stop, can be relied upon. The second form of green trouble with Anscochrome occurs when exposing and processing for 125 ASA. In this case the greenish cast must be combatted with either the CC 10 M or CC 20 M filter. (For more information on filters see *Filters for Color*, elsewhere in this issue.)

All three of these color films have a tungsten counterpart although at this writing the Anscochrome Tungsten has not been made available. Tungsten-type Kodachrome is designated as a "Type A" tungsten film, which means that its color response has been balanced for standard photofloods which burn with a color temperature of 3400 K. The speed of this material is 16 (ASA equivalent), and its latitude is sufficient that it may be relied upon for good pictures, although not perfect color fidelity, in a wide variety of tungsten illumination. Incidentally, with the Type A Conversion filter (Wratten 85-B) this film may be used outdoors as if it were a daylight film with a speed rating of ASA 10. Many people actually prefer shooting Type A Kodachrome out-of-doors with the conversion filter because of the beautiful soft quality it usually gives. However, it should be noted that the combination of Type A Kodachrome and the conversion filter does not give the same degree of exposure latitude as does regular daylight Kodachrome. In the event of underexposure where daylight Kodachrome will give deep, saturated color values, Type A with the conversion filter will tend to be muddy and flat. One good thing about Type A for outdoor shooting is that the conversion filter absorbs quite a lot of blue, probably more than the Skylight filter on regular daylight film.

The tungsten film supplied as a companion to daylight Ektachrome is known as Type F to indicate that it has been balanced to operate with clear wire-filled flashbulbs which burn at approximately 3800 K. This means less work (or thinking) for mother if she decides to make flash pictures since she doesn't have to go to the bother of getting either a blue flashbulb or a blue filter to cover either the lens or the clear flashbulb. And it also makes for higher flash guide numbers so that the camera can be stopped way down, but it doesn't do anything for the guy who wants to make available-light pictures under normal indoor tungsten illumination. If, for example, you wanted to make pictures with Type F Ektachrome and photoflood illumination you

would have to use a blue conversion filter to raise the effective color temperature of the light source (3400 K) up to the balance of the film (3800 K). The conversion filter recommended is the 82-A, although this is a very moot point. Now, once you've got this new fast color film in the camera with the blue conversion filter over the lens the exposure index of the combination is 16. This, of course, is exactly the speed of Type A Kodachrome which already is balanced for 3400 K light. In view of the superior grain quality and resolution of Kodachrome for the available-light man under tungsten-lighting conditions Type A Kodachrome is still the best weapon he's got.

Because color photography is still largely a matter of you pushing the button and someone else carrying the ball from there, the advanced speed ratings you employ with daylight Ektachrome or Anscochrome, and any required filtering, should be worked out between you and your color processor. Both Anscochrome and Ektachrome will handle exposures on the basis of 64 and 125 ASA equivalent exposure indexes. In moving from 32 to 64 to 125 Ektachrome does build up in grain structure and in the warmth of color values. With Anscochrome, shooting at the higher speed ratings does present a green hazard, but the grain differential between 64 and 125 does not seem worth mentioning.

But even used at their manufacturers' ratings of 32 these new films represent a serious threat to these photographic alibi artists who bemoan the fact that all they have is an $f/3.5$ lens. That $f/3.5$ is pretty close to an $f/2$ lens with color film three times faster than Kodachrome.—*Bob Schwalberg.*

35-mm Interchangeable Lenses

(*Continued from page* 84)

means that short focal lengths can take in more subject matter from a given point of view than can a normal focal length. But, it should be remembered, since these lenses are including a great expanse of subject matter on the same negative format as the normal lens, the size of each object in the picture is much smaller than it would be if photographed from the same distance with a lens of normal focal length. Another famous attribute of short-focus or wide-angle lenses is their vastly increased depth of field. At any given lens aperture, a short-focal-length lens will give more depth of field than a normal lens used at the same aperture and the same distance.

Wide-angle lenses today are generally available in five focal lengths: 40-mm, 35-mm, 28-mm, 25-mm, and 21-mm. Because the 40-mm lens is very close to the 43.2-mm negative diagonal, and gives relatively little increased angle of view as compared to that of the normal focal lengths, many people feel that this focal length should be referred to as a "semi-wide-angle," or "wide-field" lens. The 35-mm focal length is far and away the most popular wide-angle focal length and more short-focus lenses are made in this length than in any other. Many

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photographers, especially professional magazine and documentary people, use the 35-mm lens instead of their normal focal length for all or part of their general work. Because of its relatively wide angle of view and splendid depth-of-field characteristics, the 35-mm lens is a happy choice for candid photography of people and events under conditions where rapid shooting is imperative. The 28-, 25-, and 21-mm focal lengths are generally regarded as special-purpose lenses for use under the most trying circumstances where it isn't possible to back away sufficiently from a subject to include as much of the scene as is required. These little wonders possess amazing depth-of-field characteristics but, as we shall indicate later, they must be handled with care.

Lenses whose focal length is greater than the diagonal of the negative are known as "long-focus," or "telephoto" lenses. Actually, the word "telephoto" refers to a very special type of lens construction in which the effective focal length of the lens is greater than the lens' actual physical length. Of all the long-focus lenses on the market today, only a bare handful are true telephotos. But, probably because of the more romantic sound of the Greek-derived word "telephoto," this term persists. Telelenses have narrower fields of view than either wide-angle or normal-focal-length lenses, and since they fill the 24x36-mm frame with less subject matter each object in the scene is reproduced much larger on the negative than it would be if photographed from the same distance with a shorter-focal-length lens. Using the 50-mm focal length as a reference, at any given distance a 100-mm lens will reproduce an object twice as large, a 200-mm lens as four times as large, and so forth.

More "telephoto" focal lengths are available today than any others. Offhand we can recall 75-mm, 80-mm, 85-mm, 90-mm, 100-mm, 105-mm, 125-mm, 127-mm, 135-mm, 138-mm, 150-mm, 180-mm, 200-mm, 250-mm, 300-mm, 360-mm, 400-mm, 500-mm, 600-mm, 640-mm, 800-mm, and 1000-mm tele-lenses and there are probably a lot of other focal lengths we haven't listed. The longest lens which is factory coupled to the rangefinder of 35-mm cameras is 135-mm. Only exception to this that we can think of is the 150-mm tele-lens (a true telephoto, incidentally) supplied to couple to the rangefinder of the Robot Royal 24x24-mm motor-driven camera. Longer focal lengths are coupled to rangefinder miniatures by means of mirror-reflex housings which, in effect, convert these instruments temporarily into single-lens reflex cameras.

With all this light, medium, and heavy photographic artillery available, the choice of a long-focus lens can be confusing. In general, lenses from 75- to 100-mm are usually chosen for portraiture and for general photography where you can't get quite as near as necessary to fill the negative. For sidelines coverage of sports and other similar events, lenses from 100- to 180-mm are frequently chosen. Lenses from 180-mm on up

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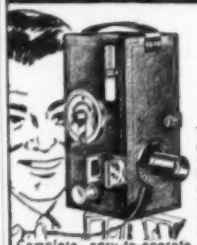

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are ungainly creatures designed for real long-distance photography, and are most often used on a tripod.

While long lenses are very useful things to have when it is necessary to obtain a large negative image of a distant object (thereby obviating the necessity of making a tremendous enlargement) they do have two drawbacks. The first is depth of field. The longer the lens, the less the depth of field at any given lens aperture and distance. If at a given distance and *f*-stop a 50-mm lens possesses twelve inches of depth, a 100-mm lens will give only six inches, a 200-mm only 3 inches, and so forth. The second disadvantage of long lenses is that while they in effect magnify the size of the subject portrayed on the negative they also magnify both subject and camera movement. A slight camera shake during a slow exposure with a 50-mm lens may go unnoticed even when the negative is enlarged. However, the same degree of shake with a 500-mm lens will be 10 times as pronounced to begin with and therefore will very likely be quite noticeable even in a very small enlargement. Relatively high shutter speeds, steady camera handling and the use of a tripod wherever possible are necessary to good long-lens technique.

Thus far we have used a number of optical terms such as "focal length" and "depth of field" without defining them. At this point let's stop to discuss these terms and bring up a few additional ones.

Any lens has four principal characteristics: focal length, aperture or speed, depth of field, and depth of focus. And all are interrelated as we shall see.

The focal length of a lens is the distance between the optical center of the lens and the film plane when the lens is focused at infinity. Infinity is a very great distance equal at least to 1,000 focal lengths. (Two special types of lenses do not have true focal lengths. These are telephoto and retrofocus lenses. The focal length of a telephoto lens is actually greater than the distance between the optical center and the film plane, and that of a retrofocus actually smaller.)

The light-transmitting power of a lens is given in terms of its relative aperture or *f*-stop. This is the ratio between the focal length and the effective diameter of the lens opening. Thus, for example, a 50-mm *f*/2 would have an effective

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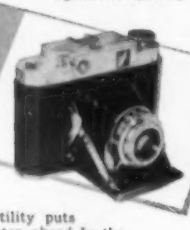

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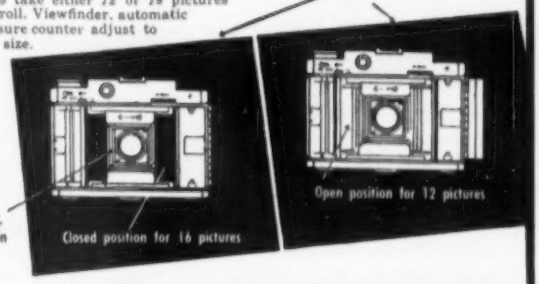

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diameter of 25 mm; a 200-mm f/8 would have the same effective diameter of 25 mm, but its light-transmitting power would be only 1/16 as great. Lens apertures today are given in the following series: f/1.4, f/2, f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22, and f/32. In a great many cases this series is broken in the case of the first f-stop on the lens when it does not fall into this grouping. For example, a lens may have its maximum aperture engraved as f/3.5 after which the series is taken up again with f/4, f/5.6, and so on. Each lens aperture in the series listed above transmits one half as much light as the stop ahead of it and twice as much as the stop following it. Thus, if our exposure meter were to advise us to shoot at f/4 and 1/100 second it would simultaneously advise f/2.8 and 1/200 and f/5.6 and 1/50 second.

An alarmingly high percentage of photographers confuse the two concepts of depth of *field* and depth of *focus*. Depth of field refers to those areas in front of and behind the subject focused upon which will also be reproduced as acceptably sharp. Depth of focus refers to the distance in which the film plane of the camera may be pushed forward or backward and still produce sharp photographs at a given focal setting. Depth of focus is determined only by two factors: the relative aperture and the maximum size of the circle of confusion, a term we shall define shortly. Depth of field depends upon these two factors plus two more: the focal length of the lens and the lens-to-subject distance.

Although we are accustomed to thinking that when a lens is "in focus" it is resolving subject detail as a pattern of points on the negative, this is not really true. The best that any lens in the world can do is to reproduce a point on the subject as a tiny irregular patch. This is termed the circle of confusion. All of our concepts of depth of field and sharpness depend upon the maximum size of the circle of confusion which we are willing to tolerate. How great a circle of confusion we accept depends in the main upon the use to which we are going to put our negative. If we customarily make contact prints we can accept a circle of confusion much larger than we could if we customarily made enlargements. A normal human eye can not distinguish between points whose diameters are less than approximately .004 inches. It is therefore conventional to accept a maximum circle of confusion whose diameter is between .002 and .003 inches. But what is "in focus" and "out of focus" is largely a matter of opinion and because of the very big enlargements made from 35-mm today, (an 8x10 print is 7.5 diameters, an 11x14, 10.5 diameters), the figure generally employed for the circle of confusion in optical formulas is .001 inches.

For practical purposes, remember that the shorter the focal length, the smaller the lens opening, or the larger the distance focused upon—the greater will be the depth of field. The longer the focal length, the larger the lens opening, or the closer the distance focused upon—the smaller will be the depth of field.

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If, however, in taking comparative pictures with two lenses of different focal lengths, you use the same aperture for both and vary your subject distance so that the image size is always the same regardless of which lens you're using—the depth of field will be the same for both lenses. Remember, we're talking about depth of field and not depth of focus. The depth of focus remains exactly the same regardless of focal length or distance. Only the speed of the lens and the circle of confusion determine the depth of focus on the film plane. According to information from the Bausch & Lomb Optical Company, an *f*/2 lens must be accurately positioned between plus or minus .0019 inches!

(For detailed information on how to test your lens for focusing accuracy, as well as for general capability see *How to Test Your Lens*, POPULAR PHOTOGRAPHY, January 1954.)

Probably the most popular fallacy about lenses is that focal length has something to do with perspective and that there is such a thing as "wide-angle perspective" or "telephoto perspective." The truth of the matter is that focal length determines the angle of view and the scale of reduction of the subject on the negative but has absolutely nothing whatever to do with perspective. Perspective, the depicting of three dimensional subjects on a flat surface so as to indicate relative dimensions and spatial relationships, is controlled by only two factors: (1) the distance from lens to subject and (2) the relative angle of view between lens and subject. (*The view camera, which permits altering of the parallel relationship between the axis of the lens and the film plane, offers a third method of controlling or correcting perspective. To date, however, no view camera has been commercially produced in the 35-mm format although a plate back with groundglass focusing screen and tiny holders was once available as a Contax accessory!*)

If we photograph from a very great distance the perspective will tend to be noticeably flat and space will seem to be compressed. Since this is most apparent in very long-distance photography, and such work is usually done with long-focal-length lenses, people tend to confuse the effect of distance with the telephoto lens. But if we make a picture from a great distance with a long lens and then with a short lens, the perspective will be exactly the same in both pictures. The shorter focal length will merely include much more subject area. If we enlarge from the center of the negative the portion corresponding to the subject matter included in the long-lens shot, the result will probably be grainy and unsharp, but the perspective will be identical as long as the same camera position was employed in both pictures.

When we photograph from very close distances, the space between objects in the picture tends to be exaggerated and space seems to be greatly expanded. This kind of picture is almost always made with short-focal-length, wide-angle lenses. But again, it isn't the focal length but the distance that creates the perspective.

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Another cause for the fallacy of "wide-angle perspective" is the fact that pictures made with wide-angle lenses often contain a distorted relationship between horizontal and vertical subject lines which we know are at perfect right angles to each other in real life. Seeing this type of picture, many photographers will say that wide-angle lenses distort. They do not. There are two ways to test this. First, put your camera, equipped with a wide-angle lens, on a tripod and use a small carpenter's level to make certain that it is level both horizontally and vertically. Then shoot a picture. After this switch to any lens of longer focal length and tilt the camera at some crazy angle. The first picture will contain true horizontals and verticals, but the second picture, made with a longer-focal-length lens, will contain the alleged "wide-angle perspective." In other words, it isn't focal length that produces distortion—it's the camera's position in relation to the lines involved.

In using interchangeable lenses on all save single-lens reflex cameras in which the subject is viewed through the actual taking lens, accessory viewfinders will be needed for some or all accessory focal lengths. These viewfinders are of three general types: Single optical viewfinders which show the field of view for only one focal length, universal finders which can be adjusted to show the field of view for several focal lengths, and open-frame finders generally called "sports finders."

Most viewfinders are provided with some sort of parallax compensation to correct for the error between what the camera lens sees and what the viewfinder (usually mounted above the camera lens) sees. Sometimes this takes the form of a line which serves as a warning to allow extra head space when photographing from close quarters, but the most popular device is a footage scale which causes the finder to tip downward at the closer distances. Universal finders are frequently of the prism and so-called "zoom" type. Prism finders show the subject as completely flat on a well-defined simulated picture frame, usually with black borders. These finders in most cases mask down from the image given for the shortest focal length on the scale and yield very poor subminiature picture frames when used with the longer focal lengths. The "zoom" type finders

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magnify at the longer focal lengths to maintain uniform field size for all focal lengths but tend to distort and have loosely defined or rounded edges. Both have their merits although if you wear glasses you will in most cases benefit from the prism style which more easily permits all four corners of the field to be viewed simultaneously.

Because interchangeable lenses vary in optical construction—some with only two or three lens elements, others with seven or eight—they do vary somewhat in actual light transmission even at the same indicated lens aperture. Some very simply constructed two- or three-element long lenses, for example, transmit more light than highly complicated speed lenses of normal focal length with more glass-to-air surfaces within the lens. The so-called "T" system in which lenses are calibrated according to light transmission rather than mathematical relative aperture is a praiseworthy effort to correct this disparity between lenses of different types. Of course, a "T" rating will tell nothing about the depth of field, and most of these "T" rated lenses also carry an *f*-system diaphragm scale.

Contrast also seems to vary from lens to lens and most very long lenses have a marked tendency toward low contrast. Both factors can easily be explored by using the same camera and shutter speed to make a series of pictures of the same subject at various diaphragm openings. In our experience the results from this kind of an experiment can best be appreciated if the negatives are intentionally underexposed and somewhat underdeveloped. By producing thin flat negatives differences in light transmission (negative density) and optical contrast can be readily seen.

In recent months many readers have written us to inquire about which interchangeable lenses they should purchase to supplement their standard 50-mm objectives. The answer is, of course, subject to personal interpretation and depends to a large extent upon the nature of the work you wish to do. Obviously if you are interested in nature photography you will purchase a long lens yielding sufficient angle of field for the distances at which you customarily work. And, if your interest runs to architecture a wide-angle lens is almost imperative.

But the photographer whose work is more general faces a more difficult choice. Sometimes his good old 50-mm lens is too long, sometimes too short. In lieu of advice on how to solve this problem we can merely report that most magazine photographers tend to find the 35-mm wide-angle and the 85-mm or 90-mm lenses the two most useful adjuncts to their normal 50-mm lens. A miniature camera equipped with these three lenses and proper finders represents tremendous potential versatility and will handle most normal situations. Lenses of longer and shorter focal length are both valuable and useful tools when you need them, but the beginner would do well first to acquire these three basic lenses.—

(For illustrations of typical long- and short-focal-length lenses, see page 140.)

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A Miracle in Black & White

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FACTORY FRESH ANSCO 535

20 EXP.—1956 DATE—FRAME NUMBERED
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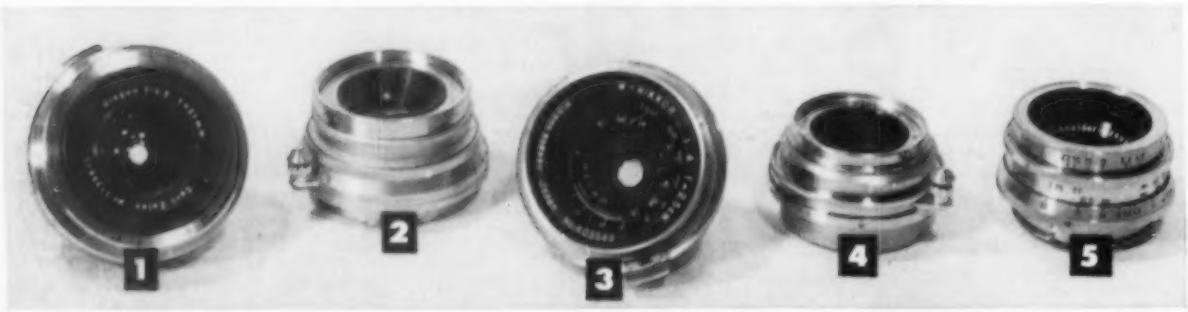
INTERCHANGEABLE LENSES continued from page 137

Here are some typical long-focus lenses

Photographs by Bob Schwalberg

1 The 125-mm Leitz Hektor *f*/2.5; the lens (made in a new Canadian plant) is set in a very short mount for use with a reflex housing only. Next are three 135-mm lenses: **2** the *f*/4 Zeiss Sonnar, **3** the *f*/3.5 Nikkor, **4** the *f*/3.5 Canon. Note the tripod bushing on the Nikkor lens, a feature common to many long lenses which create the need for the majority of support under the lens—not the camera. **5** the 400-mm Leitz Telyt *f*/5, equipped with a reflex housing and 45° eyepiece. **6** the 75-mm Zeiss Biotar *f*/1.5, made for single-lens reflex cameras only. **7** the 85-mm Zeiss Sonnar *f*/2, typical of many fast lenses in the medium-long focal lengths. **8** the 90-mm Leitz Elmar *f*/4 in a new collapsible mount for the Leica M-3 camera only. (Available in rigid mount for other Leica models.) **9** the 100-mm Canon *f*/4, in lightweight mount. **10** the new 105-mm Nikkor *f*/2.5, in black mount.

Here are some typical wide-angle lenses



1 the 21-mm Zeiss Biogon *f*/4.5, the shortest focal length ever produced for the 35-mm camera. It covers a field of 90°. **2** the 35-mm Leitz Summaron *f*/3.5. This is the most popular focal length of the variety of wide-angle lenses, covering a field of 62°. **3** the 25-mm Nikkor *f*/4, a new lens which covers a field of almost 81°. **4** the 28-mm Canon Serenar *f*/3.5; lenses of this focal length cover a 75° field. **5** the 40-mm Schneider Isogon *f*/4.5. This focal length might be termed "semi-wide angle"; its coverage is 58°, as compared to 46° for a normal 50-mm lens. Many short lenses are mounted so deep they need no lens shade.

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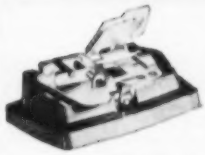

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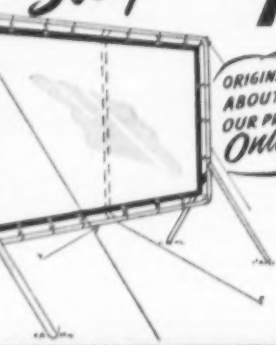

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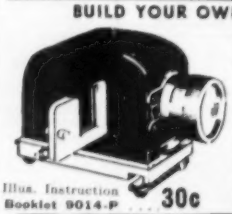

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